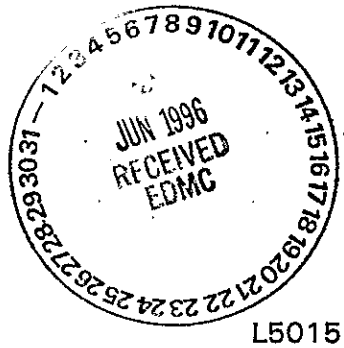
Lockheed Environmental Systems & Technologies Co.
Lockheed Analytical Services
975 Kelly Johnson Drive Las Vegas, Nevada 89119-3705
Telephone 702-361-0220 800-582-7605 Facsimile 702-361-8146

0044286 LK5015

LOCKHEED MARTIN

August 31, 1995



Ms. Joan Kessner
Bechtel Hanford, Inc.
345 Hills
P.O. Box 969
Richland, WA 99352

RE:	Log-in No.:	L5015
	Quotation No.:	Q400000-B
	SAF:	B95-069
	Document File No.:	0729596
	BHI Document File No.:	254
	SDG No.:	LK5015

The attached data report contains the analytical results of samples that were submitted to Lockheed Analytical Services on July 29, 1995. The temperature of the cooler upon receipt was 2°C. Sample containers received agree with the chain-of-custody documentation. Sample containers were received intact. Samples were not received in time to meet the analytical holding time requirements. Method 180.1 Turbidity and Method 300.0 Nitrate, Nitrite and Ortho Phosphate were received out of holding time.

The case narratives included in the following attachments provide a detailed description of all events that occurred during sample preparation, analysis, and data review specific to the samples and analytical methods requested.

A list of data qualifiers, chain-of-custody forms, sample receiving checklist, and log-in report are also enclosed representing the samples received within this group.

If you have any questions concerning the analysis or the data please call Kathleen Hall at (509) 943-4423.

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Lockheed Analytical Services

Log-in No.: L5015
Quotation No.: Q400000-B
SAF: B95-069
Document File No.: 0729596
WHC Document File No.: 254
SDG No.: LK5015

Release of this data report has been authorized by the Laboratory Director or the Director's designee as evidenced by the following signature.

" I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manger or a designee, as verified by the following signature."

Sincerely,

Karen Hermann for

Kathleen M. Hall
Client Services Representative

cc: Client Services
Document Control

CASE NARRATIVE
INORGANIC NON METALS ANALYSES

The routine calibration and quality control analyses performed for this batch include as applicable: instrument tune (ICP/MS only), initial and continuing calibration verification, initial and continuing calibration blanks, method blank(s), laboratory control sample(s), ICP interference check samples (ICP only), serial dilutions, analytical (post-digestion) spike samples, matrix spike (predigestion) sample(s), duplicate sample(s).

Preparation and Analysis Requirements

- One water sample was received for LK5015 and analyzed in batch 729 bh for selected analytes as requested on the chain of custody. Quality control analysis was performed on the following sample:

Client ID	LAL #		Method
BOG866	L5015-4	DUP, MS	180.1 Turbidity
BOG866	L5015-3	DUP, MS	300.0 Chloride, Fluoride, Nitrate-Nitrogen, Nitrite-Nitrogen, Orthophosphate and Sulfate

Holding Time Requirements

- All samples were analyzed within the method-specific holding times with the exception of Method 300.0 Nitrate-Nitrogen, Nitrite-Nitrogen and Orthophosphate which were received outside of holding time. All associated samples are flagged with an "H".

Method Blanks

- The concentration levels of all the requested analytes in the method blank were below the reporting detection limits.

Internal Quality Control

- All Internal Quality Control were within acceptance limits.

Kay McCann
Prepared By

August 2, 1995
Date

CASE NARRATIVE
INORGANIC METALS ANALYSES

The routine calibration and quality control analyses performed for this batch include as applicable: instrument tune (ICP/MS only), initial and continuing calibration verification, initial and continuing calibration blanks, method blank(s), laboratory control sample(s), ICP interference check samples (ICP only), serial dilutions, analytical (post-digestion) spike samples, matrix spike (predigestion) sample(s), duplicate sample(s).

Preparation and Analysis Requirements

- One water sample for total metals analysis by EPA Method 6010. The samples were prepared as LAS Batch 729BHT and analyzed for selected analytes as requested on the chain of custody. Sample B0G866 (L5015-2) was used for matrix spike and duplicate and serial dilution. All data flags due to the performance of the above-mentioned QC are also associated with every sample digested with this batch.

Holding Time Requirements

- All samples were analyzed within the method-specific holding times.

Internal Quality Control

- All internal quality control were within acceptance limits.

Sample Results

- The following qualifiers are reported on the basis of the techniques employed to perform the analyses:

  "P" ICP-AES

Nalini Prabhakar — **Prepared By**

08/11/95 — **Date**

CASE NARRATIVE
INORGANIC METALS ANALYSES

The routine calibration and quality control analyses performed for this batch include as applicable: instrument tune (ICP/MS only), initial and continuing calibration verification, initial and continuing calibration blanks, method blank(s), laboratory control sample(s), ICP interference check samples (ICP only), serial dilutions, analytical (post-digestion) spike samples, matrix spike (predigestion) sample(s), duplicate sample(s).

Preparation and Analysis Requirements

- One water sample for dissolved metals analysis by EPA Method 6010. As the measured turbidity of the sample was less than 1 NTU, it was batched as 729BHD for selected dissolved analytes as requested on the chain of custody. Sample B0G867 (L5015-12) was used for matrix spike and duplicate and serial dilution. All data flags due to the performance of the above-mentioned QC are also associated with every sample digested with this batch.

Holding Time Requirements

- All samples were analyzed within the method-specific holding times.

Internal Quality Control

- All internal quality control were within acceptance limits with the following exceptions:
- In the analysis of calcium, the percent difference of serial dilution slightly exceeded the 10% control limit. This may be due to physical interferences. All calcium results for the associated samples are flagged with an "E".

Sample Results

- The following qualifiers are reported on the basis of the techniques employed to perform the analyses:

"P" ICP-AES

Nalini Prabhakar — **Prepared By**

08/11/95 — **Date**

CASE NARRATIVE
RADIOCHEMICAL ANALYSES

The routine calibration and quality control (QC) analyses performed for this batch include as applicable: instrument calibration, initial and continuing calibration verification, quench monitoring standards, instrument background analysis, method blanks, yield tracer, laboratory control samples, matrix spike samples, duplicate samples.

NOTE: Chemical recoveries and minimum detectable activities (MDAs)can be found on the preparation sheets and calculation sheets on the attached raw data for each method.

Holding Time Requirements

All holding times were met.

Analytical Method Isotopic Uranium

The isotopic uranium analysis was performed using standard operating procedure (SOP), LAL-91-SOP-0108. The samples were analyzed in workgroup 26719. No problems were encountered during analysis and all QC criteria were met. No re-analyses were performed.

Analytical Method Gamma Spectrometry

The gamma spectrometry analysis was performed using SOP, LAL-91-SOP-0063. The samples were analyzed in workgroup 23498. No problems were encountered during the analysis and all QC criteria were met. No re-analyses were performed.

Analytical Method Gross Alpha/Beta

The gross alpha/beta analysis was performed using SOP, LAL-91-SOP-0060. The samples were analyzed in workgroup 25854. No problems were encountered during analysis and all QC criteria were met with the following exception: The alpha matrix spike (MS) recovery was out of QC criteria. Because duplicate (25854DUP1) and sample BOG866 (L5015-5) activities were below the MDA data quality is not believed to be affected. No re-analyses were performed.

Analytical Method Strontium-90

The strontium-90 analysis was performed using SOP, LAL-91-SOP-0196. The samples were analyzed in workgroup 25855. No problems were encountered during the analysis and all QC criteria were met. No re-analyses were performed.

Analytical Method Carbon-14

The carbon-14 analysis was performed using SOP, LAL-93-SOP-0209. The samples were analyzed in workgroup 26505. No problems were encountered during the analysis and all QC criteria were met with the following exception: The MS recovery was out of QC criteria. Because all other QC criteria were met data quality is not believed to be affected. No re-analyses were performed.

Analytical Method Tritium

The tritium analysis was performed using SOP, LAL-91-SOP-0066. The samples were analyzed in workgroup 25853. No problems were encountered during analysis and all QC criteria were met. No re-analyses were performed.

Andrea Tippett
Prepared By

August 31, 1995
Date

Lockheed Analytical Services
DATA QUALIFIERS FOR INORGANIC ANALYSES
[Revised 08/28/92]

For Use on the Analytical Data Reporting Forms	
B	***For CLP Analyses Only*** – Reported value is less than the contract required detection limit (CRDL) but greater than or equal to the instrument detection limit (IDL).
C	***For Routine, Non-CLP Analyses Only*** – Any constituent that was also detected in the associated blank whose concentration was greater than the reporting detection limit (RDL).
D	Presence of high levels of interfering constituents required dilution of sample which increased the RDL by the dilution factor.
E	Estimated value due to presence of interference.
H	Sample analysis performed outside of method-or client-specified maximum holding time requirement.
M	***For CLP Analyses Only*** – Duplicate injection precision criterion was not met.
N	Matrix spike recovery exceeded acceptance limits.
S	Reported value was determined from the method of standard addition.
U	***For CLP Reporting Only*** – Constituent was analyzed for but not detected (sample quantitation must be corrected for dilution and percent moisture).
W	***For AAS Only*** – Post-digestion spike for Furnace AAS did not meet acceptance criteria and sample absorbance is less than 50% of spike absorbance.
X, Y, or Z	Analyst-defined qualifier.
*	Relative percent difference (RPD) for duplicate analysis exceeded acceptance limits.
+	Correlation coefficient (r) for the MSA is less than 0.995.
For Use on the QC Data Reporting Forms	
a[1]	The spike recovery and/or RPD for matrix spike and matrix spike duplicates cannot be evaluated due to insufficient spiking level compared to the elevated sample analyte concentration.
b[1]	The RPD cannot be computed because the sample and/or duplicate concentration was below the RDL.

[1] Used as footnote designations on the QC summary form.

Lockheed Analytical Services

DATA QUALIFIERS FOR RADIOCHEMICAL ANALYSES

[Revised 08/28/92]

For Use on the Analytical Data Reporting Forms	
B	Any constituent that was also detected in the associated blank whose concentration was greater than the reporting detection limit (RDL) and/or minimum detectable activity (MDA).
C	Presence of high TDS in sample required reduction of sample size which increased the MDA.
D	Constituent detected in the diluted sample.
E	Constituent concentration exceeded the calibration or attenuation curve range.
F	***For Alpha Spectrometry Only***-- FWHM exceeded acceptance limits.
H	Sample analysis performed outside of method-specified maximum holding time requirement.
Y	Chemical yield exceeded acceptance limits.
For Use on the QC Data Reporting Forms	
*	QC data (i.e., percent recovery data for laboratory control standard and matrix spike; and RPD for replicate analyses) exceeded acceptance limits.
a[1]	The spike recovery and/or RPD for matrix spike and duplicates cannot be evaluated due to insufficient spiking level compared to the elevated sample analyte concentration.
b[1]	The RPD cannot be computed because the sample and/or duplicate concentration was below the MDA.

[1] Used as foot note designations on the QC summary form.

Revised

LOCKHEED ANALYTICAL SERVICES
LOGIN CHAIN OF CUSTODY REPORT (ln01)
Aug 05 1995, 07:14 am

Login Number: L5015
Account: 596 Bechtel Hanford, Inc. * Richland, WA
* Project: BECHTEL-HANFORD Bechtel Hanford Project

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	PR	Due Date
L5015-1	B0G866	27-JUL-95	29-JUL-95		28-AUG-95
TEMP 2					
Location: 157					
Water 1 S SCREENING		Hold:23-JAN-96			
L5015-2	B0G866	27-JUL-95	29-JUL-95		28-AUG-95
TEMP 2					
Location: 133					
Water 1 S 6010 ICP METALS		Hold:23-JAN-96			
L5015-3	B0G866	27-JUL-95	29-JUL-95		28-AUG-95
TEMP 2					
Location: 156-019					
Water 1 S 300.0 CHLORIDE		Hold:24-AUG-95			
Water 1 S 300.0 FLUORIDE		Hold:24-AUG-95			
Water 1 S 300.0 NITRATE		Hold:29-JUL-95			
Water 1 S 300.0 NITRITE		Hold:29-JUL-95			
Water 1 S 300.0 PHOSPHATE		Hold:29-JUL-95			
Water 1 S 300.0 SULFATE		Hold:24-AUG-95			
L5015-4	B0G866	27-JUL-95	29-JUL-95		28-AUG-95
TEMP 2					
Location: RFG19-103C					
Water 1 S 180.1 TURBIDITY		Hold:29-JUL-95			
L5015-5	B0G866	27-JUL-95	29-JUL-95		28-AUG-95
TEMP 2					
Location: 142					
Water 1 S GAMMA SPEC LAL-0063		Hold:23-JAN-96			
Water 1 S GR ALP/BETA LAL-0060		Hold:23-JAN-96			
Water 1 S SR-90 LAL-0196		Hold:23-JAN-96			
Water 1 S U-ISOTOPIC LAL-0108		Hold:23-JAN-96			
L5015-6	B0G866	27-JUL-95	29-JUL-95		28-AUG-95
TEMP 2					
Location: 142					
L5015-7	B0G866	27-JUL-95	29-JUL-95		28-AUG-95
TEMP 2					
Location: 156-022F					
L5015-8	B0G866	27-JUL-95	29-JUL-95		28-AUG-95
TEMP 2					
Location: 156-022F					

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LOCKHEED ANALYTICAL SERVICES
LOGIN CHAIN OF CUSTODY REPORT (1n01)
Aug 05 1995, 07:14 am

Login Number: L5015
Account: 596 Bechtel Hanford, Inc. * Richland, WA
Project: BECHTEL-HANFORD Bechtel Hanford Project

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	Due PR Date
L5015-9	B0G866	27-JUL-95	29-JUL-95	28-AUG-95
TEMP 2				
Location: 156-022F				
L5015-10	B0G866	27-JUL-95	29-JUL-95	28-AUG-95
TEMP 2				
Location: 156-022F				
L5015-11	B0G866	27-JUL-95	29-JUL-95	28-AUG-95
TEMP 2				
Location: 156-012				
Water 1 S C-14	LAL-0209	Hold:23-JAN-96		
Water 1 S TRITIUM(H3)	LAL-0066	Hold:23-JAN-96		
-L5015-12	B0G867	27-JUL-95	29-JUL-95	28-AUG-95
TEMP 2				
Location: 153				
Filt H20 15 S 6010	ICP METALS	Hold:23-JAN-96		
L5015-13	REPORT TYPE	29-JUL-95	29-JUL-95	28-AUG-95
Location:				
Water 1 S EDD - DISK DEL.				
Water 1 S INORG TYPE 4A RPT				
Water 1 S RAD RPT TYPE 4F				

* Project ID changed from Westinghouse to Bechtel

Signature: Karen Herman

Date: 8.5.95

015

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Revised

LOCKHEED ANALYTICAL SERVICES
LOGIN CHAIN OF CUSTODY REPORT (ln01)
Jul 31 1995, 02:13 pm

Login Number: L5015
Account: 596 Bechtel Hanford, Inc. * Richland, WA
Project: BECHTEL-HANFORD Bechtel Hanford Project

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	Due PR Date
L5015-1	B0G866	27-JUL-95	29-JUL-95	28-AUG-95
TEMP 2				
Location: 157				
Water 1 S SCREENING		Hold:23-JAN-96		
L5015-2	B0G866	27-JUL-95	29-JUL-95	28-AUG-95
TEMP 2				
Location: RAD156-05				
Water 1 S 6010 ICP METALS		Hold:23-JAN-96		
L5015-3	B0G866	27-JUL-95	29-JUL-95	28-AUG-95
TEMP 2				
Location: 157				
Water 1 S 300.0 CHLORIDE		Hold:24-AUG-95		
Water 1 S 300.0 FLUORIDE		Hold:24-AUG-95		
Water 1 S 300.0 NITRATE		Hold:29-JUL-95		
Water 1 S 300.0 NITRITE		Hold:29-JUL-95		
Water 1 S 300.0 PHOSPHATE		Hold:29-JUL-95		
Water 1 S 300.0 SULFATE		Hold:24-AUG-95		
L5015-4	B0G866	27-JUL-95	29-JUL-95	28-AUG-95
TEMP 2				
Location: 160				
Water 1 S 180.1 TURBIDITY		Hold:29-JUL-95		
L5015-5	B0G866	27-JUL-95	29-JUL-95	28-AUG-95
TEMP 2				
Location: 157				
Water 1 S GAMMA SPEC LAL-0063		Hold:23-JAN-96		
Water 1 S GR ALP/BETA LAL-0060		Hold:23-JAN-96		
Water 1 S SR-90 LAL-0196		Hold:23-JAN-96		
Water 1 S U-ISOTOPIC LAL-0108		Hold:23-JAN-96		
L5015-6	B0G866	27-JUL-95	29-JUL-95	28-AUG-95
TEMP 2				
Location: 157				
L5015-7	B0G866	27-JUL-95	29-JUL-95	28-AUG-95
TEMP 2				
Location: 157				
L5015-8	B0G866	27-JUL-95	29-JUL-95	28-AUG-95
TEMP 2				
Location: 157				

310

0709596

LOCKHEED ANALYTICAL SERVICES
LOGIN CHAIN OF CUSTODY REPORT (ln01)
Jul 31 1995, 02:13 pm

Login Number: L5015
Account: 596 Bechtel Hanford, Inc. * Richland, WA
Project: BECHTEL-HANFORD Bechtel Hanford Project

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	PR	Due Date
L5015-9	B0G866	27-JUL-95	29-JUL-95		28-AUG-95
TEMP 2					
Location: 157					
L5015-10	B0G866	27-JUL-95	29-JUL-95		28-AUG-95
TEMP 2					
Location: 157					
L5015-11	B0G866	27-JUL-95	29-JUL-95		28-AUG-95
TEMP 2					
Location: 157					
Water 1 S C-14 LAL-0209		Hold:23-JAN-96			
Water 1 S TRITIUM(H3) LAL-0066		Hold:23-JAN-96			
L5015-12	B0G867	27-JUL-95	29-JUL-95		28-AUG-95
TEMP 2					
Location: 153					
Filt H20 15 S 6010 ICP METALS		Hold:23-JAN-96			
L5015-13	REPORT TYPE	29-JUL-95	29-JUL-95		28-AUG-95
Location:					
* Water 1 S EDD - DISK DEL.					
Water 1 S INORG TYPE 4A RPT					
Water 1 S RAD RPT TYPE 4F					

* Report type changed.

Signature: Karen Hyman 01

Date: 7.31.95

C 1295

Revised

LOCKHEED ANALYTICAL SERVICES
LOGIN CHAIN OF CUSTODY REPORT (ln01)
Jul 31 1995, 08:42 am

Login Number: L5015
Account: 596 Bechtel Hanford, Inc. * Richland, WA
* Project: BECHTEL-HANFORD Bechtel Hanford Project

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	PR	Due Date
L5015-1	B0G866	27-JUL-95	29-JUL-95		28-AUG-95
TEMP 2					
Location: 157					
Water 1 S SCREENING		Hold:23-JAN-96			
L5015-2	B0G866	27-JUL-95	29-JUL-95		28-AUG-95
TEMP 2					
Location: RAD156-05					
Water 1 S 6010 ICP METALS		Hold:23-JAN-96			
L5015-3	B0G866	27-JUL-95	29-JUL-95		28-AUG-95
TEMP 2					
Location: RAD156-05					
Water 1 S 300.0 CHLORIDE		Hold:24-AUG-95			
Water 1 S 300.0 FLUORIDE		Hold:24-AUG-95			
Water 1 S 300.0 NITRATE		Hold:29-JUL-95			
Water 1 S 300.0 NITRITE		Hold:29-JUL-95			
Water 1 S 300.0 PHOSPHATE		Hold:29-JUL-95			
Water 1 S 300.0 SULFATE		Hold:24-AUG-95			
L5015-4	B0G866	27-JUL-95	29-JUL-95		28-AUG-95
TEMP 2					
Location: 133					
Water 1 S 180.1 TURBIDITY		Hold:29-JUL-95			
L5015-5	B0G866	27-JUL-95	29-JUL-95		28-AUG-95
TEMP 2					
Location: 157					
Water 1 S GAMMA SPEC LAL-0063		Hold:23-JAN-96			
Water 1 S GR ALP/BETA LAL-0060		Hold:23-JAN-96			
Water 1 S SR-90 LAL-0196		Hold:23-JAN-96			
Water 1 S U-ISOTOPIC LAL-0108		Hold:23-JAN-96			
L5015-6	B0G866	27-JUL-95	29-JUL-95		28-AUG-95
TEMP 2					
Location: 157					
L5015-7	B0G866	27-JUL-95	29-JUL-95		28-AUG-95
TEMP 2					
Location: 157					
L5015-8	B0G866	27-JUL-95	29-JUL-95		28-AUG-95
TEMP 2					
Location: 157					

018

0729596

LOCKHEED ANALYTICAL SERVICES
LOGIN CHAIN OF CUSTODY REPORT (ln01)
Jul 31 1995, 08:42 am

Login Number: L5015
Account: 596 Bechtel Hanford, Inc. * Richland, WA
Project: BECHTEL-HANFORD Bechtel Hanford Project

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	PR	Due Date
L5015-9	B0G866	27-JUL-95	29-JUL-95		28-AUG-95
TEMP 2					
Location: 157					
L5015-10	B0G866	27-JUL-95	29-JUL-95		28-AUG-95
TEMP 2					
Location: 157					
L5015-11	B0G866	27-JUL-95	29-JUL-95		28-AUG-95
TEMP 2					
Location: 157					
Water 1 S C-14 LAL-0209		Hold:23-JAN-96			
Water 1 S TRITIUM(H3) LAL-0066		Hold:23-JAN-96			
L5015-12	B0G867	27-JUL-95	29-JUL-95		28-AUG-95
TEMP 2					
Location: RAD156-05					
Filt H20 15 S 6010 ICP METALS		Hold:23-JAN-96			
L5015-13	REPORT TYPE	29-JUL-95	29-JUL-95		28-AUG-95
Location:					
Water 1 S EDD - DISK DEL.					
Water 1 S INORG TYPE 2 RPT					
Water 1 S RAD RPT TYPE 2					

* Project changed from Westinghouse Hanford to Bechtel Hanford per COC.

Signature: Karen Hermann

Date: 7.31.95

019

C72959

LOCKHEED ANALYTICAL SERVICES
LOGIN CHAIN OF CUSTODY REPORT (ln01)
Jul 29 1995, 11:27 am

Login Number: L5015
Account: 512 Westinghouse Hanford Co. * Richland, WA
Project: WESTINGHOUSE-HANFORD Westinghouse Hanford Project (Richland,WA)

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	Due PR Date
L5015-1	B0G866	27-JUL-95	29-JUL-95	28-AUG-95
TEMP 2				
Location: 157				
Water 1 S SCREENING		Hold:23-JAN-96		
L5015-2	B0G866	27-JUL-95	29-JUL-95	28-AUG-95
TEMP 2				
Location: 157				
Water 1 S 6010 ICP METALS		Hold:23-JAN-96		
L5015-3	B0G866	27-JUL-95	29-JUL-95	28-AUG-95
TEMP 2				
Location: 157				
Water 1 S 300.0 CHLORIDE		Hold:24-AUG-95		
Water 1 S 300.0 FLUORIDE		Hold:24-AUG-95		
Water 1 S 300.0 NITRATE		Hold:29-JUL-95		
Water 1 S 300.0 NITRITE		Hold:29-JUL-95		
Water 1 S 300.0 PHOSPHATE		Hold:29-JUL-95		
Water 1 S 300.0 SULFATE		Hold:24-AUG-95		
L5015-4	B0G866	27-JUL-95	29-JUL-95	28-AUG-95
TEMP 2				
Location: 157				
Water 1 S 180.1 TURBIDITY		Hold:29-JUL-95		
L5015-5	B0G866	27-JUL-95	29-JUL-95	28-AUG-95
TEMP 2				
Location: 157				
Water 1 S GAMMA SPEC LAL-0063		Hold:23-JAN-96		
Water 1 S GR ALP/BETA LAL-0060		Hold:23-JAN-96		
Water 1 S SR-90 LAL-0196		Hold:23-JAN-96		
Water 1 S U-ISOTOPIC LAL-0108		Hold:23-JAN-96		
L5015-6	B0G866	27-JUL-95	29-JUL-95	28-AUG-95
TEMP 2				
Location: 157				
L5015-7	B0G866	27-JUL-95	29-JUL-95	28-AUG-95
TEMP 2				
Location: 157				
L5015-8	B0G866	27-JUL-95	29-JUL-95	28-AUG-95
TEMP 2				
Location: 157				

02C

0729596

LOCKHEED ANALYTICAL SERVICES
LOGIN CHAIN OF CUSTODY REPORT (ln01)
Jul 29 1995, 11:27 am

Login Number: L5015
Account: 512 Westinghouse Hanford Co. * Richland, WA
Project: WESTINGHOUSE-HANFORD Westinghouse Hanford Project (Richland,WA)

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	Due PR Date
L5015-9	B0G866	27-JUL-95	29-JUL-95	28-AUG-95
TEMP 2				
Location: 157				
L5015-10	B0G866	27-JUL-95	29-JUL-95	28-AUG-95
TEMP 2				
Location: 157				
L5015-11	B0G866	27-JUL-95	29-JUL-95	28-AUG-95
TEMP 2				
Location: 157				
Water 1 S C-14 LAL-0209		Hold:23-JAN-96		
Water 1 S TRITIUM(H3) LAL-0066		Hold:23-JAN-96		
L5015-12	B0G867	27-JUL-95	29-JUL-95	28-AUG-95
TEMP 2				
Location: 157				
Filt H20 15 S 6010 ICP METALS		Hold:23-JAN-96		
L5015-13	REPORT TYPE	29-JUL-95	29-JUL-95	28-AUG-95
Location:				
Water 1 S EDD - DISK DEL.				
Water 1 S INORG TYPE 2 RPT				
Water 1 S RAD RPT TYPE 2				

Signature: Paula Davis

Date: 7-29-95

021

0729596

Bechtel Hanford, Inc. L5015 **CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST**

Page 1 of 1

Data Turnaround: ☐ Priority ■ Normal

Collector: K-Lee	Company Contact: R. E. Peterson	Telephone: (509) 372-9638
Project Designation: 100-KR-4 Groundwater Sampling - Round 8	Sampling Location: 100 K	SAF No.: B95-069
Ice Chest No.: ERC-FS-001	Field Logbook No.: ERC-1049	Method of Shipment: Federal Express BN 7-28-95
Shipped To: Lockheed	Offsite Property No.: BW 7-28-95 NHA W95-0-0204-42	Bill of Lading/Air Bill No.: NXA 2904635937
Possible Sample Hazards/Remarks		

Preservation	HNO_3	Cool 4°C	Cool 4°C	HNO_3	Cool 4°C	Cool 4°C		HNO_3		
Type of Container	G	G	P/G	P/G	G	P/G		G		
No. of Container(s)	1	1	1	6	1	1		1		
Volume	500mL	500mL	250mL	1L	1L	20mL		500mL		
SAMPLE ANALYSIS	ICP Metals - TAL (Unfiltered)	Anions (IC) - F, Cl, SO_4, NO_2, NO_3, PO_4	Turbidity	Gross Alpha, Gross Beta, U-234/235/238, Sr-90, Gamma	Tritium, C-14	Activity Scan		ICP Metals - TAL (Filtered)		

Sample No.	Matrix*	Date Sampled	Time Sampled									
B0G866	W	7-27-95	1020 1122	X	X	X	X	X	X			
B0G867	W	7-27-95	1020 1122								X	

7-27-95 RR

CHAIN OF POSSESSION — Sign/Print Names

	Date/Time		Date/Time
Relinquished By: AGR 2220 (ERC)	7-27-95 1415	Received By: ERC Kim Whitten Bk Whitten	7-27-95 1415
Relinquished By: ERC Kim Whitten Bk Whitten	7-28-95 0800	Received By	
Relinquished By		Received By	
Relinquished By		Received By	

SPECIAL INSTRUCTIONS

Sample analysis for phosphate, nitrate, and nitrite by EPA 300.0; and turbidity by EPA 180.1 is being requested for information only. The ERC Contractor acknowledges that the 48-hour holding time will not be met.

The Activity Scan is for all sample numbers listed on this chain of custody.

Matrix*: S = Soil; SE = Sediment; SO = Solid; SL = Sludge; W = Water; O = Oil; A = Air; DS = Drum Solids; DL = Drum Liquids; T = Tissue; WI = Wipe; L = Liquid; V = Vegetation; X = Other

LABORATORY SECTION — Received By: Paul C Davis — Title: Sample Custodian — Date/Time: 7-29-95/9:15am

FINAL SAMPLE DISPOSITION — Disposal Method — Disposed By — Date/Time

6 bottles 720

Environmental Restoration Contractor **ERC Team**

Interoffice Memorandum

Job No. 22192
Written Response Required: NO
CCN: N/A
OU: 100-KR-3
TSD: N/A
ERA: N/A
Subject Code: 5E50

TO: W. S. Thompson N3-06

DATE: July 5, 1995

COPIES: R. L. Biggerstaff H4-91

FROM: S. K. De Mers
Radiological Controls
N3-06/376-2764

SUBJECT: **1995 Round 8 sampling for 100-KR-4**

There is no need to perform total activities prior to offsite shipment to NRC licensed labs of samples taken from the attached list of wells.

All wells listed in the attachment were reviewed for radiological content. No well listed has a β activity in excess of 100,000 pCi/l (<.1 uCi/sample based on a 1 liter sample size) nor any α activity in excess of 10,000 pCi/l (<.01 uCi/l based on a 1 liter sample). All wells show activities < 2,000 pCi/gm (< 2 nCi/gm D.O.T. limit). The highest activity in recent samples is 1.56 E6 pCi/l $\beta(H^3)$ and 150 pCi/l α.

Radiological monitoring during sampling will only be required if the wells are located in radiological areas or if the wells themselves are labeled with radiological stickers. Monitoring requirements for down hole work such as pump removal will be determined based on the history of each well on a case by case basis.

skd

0729596

100-KR-4 GROUNDWATER SAMPLING ROUND 8

199-K-11
199-K-13
199-K-18
199-K-19
199-K-20
199-K-21
199-K-22
199-K-23
199-K-27
199-K-30
199-K-31
199-K-32A
199-K-32B
199-K-33
199-K-34
199-K-35
199-K-36
199-K-37
199-K-106A
199-K-107A
199-K-108A
199-K-109A
199-K-110A
199-K-111A
699-70-68
699-73-61
699-78-62

0729596

SAMPLE CHECK-IN LIST

Date/Time Received: 2-29-95/9:15am SDG#: _____

Work Order Number: _____ SAF #: B95-069

Shipping Container ID: EREC-FS-001 Chain of Custody # ~~B95-069~~ B2D 2-29-95

1. Custody Seals on shipping container intact? Yes [X] No [ ]
2. Custody Seals dated and signed? Yes [X] No [ ]
3. Sample temperature 2°C
4. Vermiculite/packing materials is Wet [ ] Dry [X]
5. Each sample is in a plastic bag? Yes [ ] No [X]
6. Sample holding times exceeded? Yes [X] No [ ]

7. Samples have:
   - ____ tape
   - X custody seals
   - ____ hazard labels
   - ____ appropriate sample labels

8. Samples are:
   - X in good condition
   - ____ broken
   - ____ leaking
   - ____ have air bubbles

9. Is the information on the COC and Sample bottles in agreement?

   Yes [X] No [ ]

Notes: _____

Sample Custodian/Laboratory: Paula Davis/Lockheed Date: 2-29-95/9:15am

Telephoned To: _____ On _____ By _____

025

0729596

LOCKHEED MARTIN

Sample Login
Login Review Checklist

Lot Number L5015

The login review should be conducted by that person logging in the samples as well as a peer. Please use this checklist to ensure that such reviews occur in a uniform basis. Please sign and date below to verify that a login review has occurred. This checklist should be affixed to each login package prior to distribution.

For effective login review, at a minimum, five reports form the login process are required. These are the COC (or equivalent), the login COC report, the sample summary report, the sample receiving checklist, and the login quotation. Before beginning review, ensure that these five components are available. Jobs with single component samples, the sample summary report may be omitted.

SAMPLE SUMMARY REPORT	YES	NO	N/A	Comment
1. Are all sample ID's correct?	X			
2. Are all samples present?	X			
3. Are all matrices indicated correctly?	X			
4. Are all analyses on the COC logged in for the appropriate samples?	X			
5. Are all analyses logged in for the correct container?	X			
6. Are samples logged in according to LAS batching procedures?	X			

LOGIN CHAIN OF CUSTODY	YES	NO	N/A	Comment
1. Are the collect, receive, and due dates correct for every sample?	X			
2. Have all appropriate comments been indicated in the comment section?			X	

SAMPLE RECEIVING CHECKLIST	YES	NO	N/A	Comment
1. Are all discrepancies between the COC and the login noted (if applicable)?			X	

Paula Davis — primary review signature — 7-29-95 — date

Paula Davis — secondary review signature — 7-29-95 — date

02E
0729596

Lockheed Analytical Services
Sample Receiving Checklist

Client Name: Westinghouse - Hanford Job No. L5015 Cooler ID: wet

COOLER CONDITION UPON RECEIPT

Temperature of cooler upon receipt:	2°C
temperature of temp. blank upon receipt:	

	Yes	No	* Comments/Discrepancies
custody seals intact	x		
chain of custody present	x		
blue ice (or equiv.) present/frozen	x		
rad survey completed	x		

SAMPLE CONDITION UPON RECEIPT

	Yes	No	* Comments/Discrepancies
all bottles labeled	x		
samples intact	x		
proper container used for sample type	x		
sample volume sufficient for analysis	x		
proper pres. indicated on the COC	x		
VOA's contain headspace		NA	
are samples bi-phasic (if so, indicate sample ID'S):		NA	

MISCELLANEOUS ITEMS

	Yes	No	* Comments/Discrepancies
samples with short holding times	x	PS	Nitrate/nitrites, passed holding times
samples to subcontract		NA	

ADDITIONAL COMMENTS/DISCREPANCIES

Completed by / date: Paula Adams 7-25-95

Sent to the client (date/initials): ** Client's signature upon receipt:

*Notes: * = contact the appropriate CSR of any discrepancies immediately upon receipt*

*** = please review this information and return via facsimile to the appropriate CSR (702) 361-8146*

Archive 20

Version 2.0 (11/11/94)

Lockheed Analytical Laboratory
SAMPLE SUMMARY REPORT (su02)
Westinghouse Hanford Co. * Richland, WA

Client Sample Number	LAL Sample Number	SDG Number	Matrix	Method
B0G866	L5015-1		Water	SCREENING
	L5015-2		Water	6010 ICP METALS
	L5015-3		Water	300.0 CHLORIDE
	L5015-3		Water	300.0 FLUORIDE
	L5015-3		Water	300.0 NITRATE
	L5015-3		Water	300.0 NITRITE
	L5015-3		Water	300.0 PHOSPHATE
	L5015-3		Water	300.0 SULFATE
	L5015-4		Water	180.1 TURBIDITY
	L5015-5		Water	GAMMA SPEC LAL-0
	L5015-5		Water	GR ALP/BETA LAL-
	L5015-5		Water	SR-90 LAL-0196
	L5015-5		Water	U-ISOTOPIC LAL-0
	L5015-11		Water	C-14 LAL-0209
	L5015-11		Water	TRITIUM(H3) LAL-(
B0G867	L5015-12		Filt H20	6010 ICP METALS
REPORT TYPE	L5015-13		Water	EDD - DISK DEL.
	L5015-13		Water	INORG TYPE 2 RPT
	L5015-13		Water	RAD RPT TYPE 2

Lockheed Analytical Laboratory

Nonmetals Analytical Data Technical Review Checklist (Analyst)

Analyst Name *(Print)*: PAUL Lucks	**Analysis Date:** 07/31/95 & 08/01/95
Client(s) Name: WESTINGHOUSE. HANFORD	**LAL Batch ID:** 729-WH
Method No: 300.0 Anions & Br^- F^-, O-phosphate.	**Instrument:** IC-SYS 192

YR 8/2/95

Description	Yes	No	Comments	
Completeness Review 1. Was required method/SOP followed?	✓			
2. Are <u>all</u> raw data available and labeled properly (e.g., methods used, units, sample IDs, dilution factors, reruns)?	✓			
3. Are <u>all</u> nonconformities in the raw data noted and/or explained?	✓			
4. Were <u>all</u> the client samples analyzed for all constituents and QC as specified on the LAL Bench Sheets?	✓			
Data Quality Assessment 5. Were samples properly preserved and analyzed within the method-specified holding time?	✓	X	NO_3-N, NO_2-N and O-P received on Saturday, and passed 'HT'.	
6. Are instrument calibration criteria met?	✓			
7. Are initial and continuing calibration verification data (bracketing the samples of interest) within criteria?	✓			
8. Are bracketing initial and continuing calibration blank data within criteria?	✓			
9. Are matrix spike and/or matrix spike duplicate (if required) recovery data within criteria?	✓			
10. Are method blank data within criteria?	✓			
11. Are duplicate precision data within criteria?	✓			
12. Are laboratory control sample data within criteria?	✓			
13. Has spike verification been performed adequately?	✓		***LAL ID(s):*** LS015-3	***SVP Initials:***
14. Has the *status* been updated in the ACS?	✓			

Notes and comments:

I certify, to the best of my knowledge, that the data are acceptable and in compliance with the laboratory policies and client requests, except as noted above.

08/02/95
Analyst's Signature/Date

YR 8/2/95
Secondary Reviewer's Initials/Date

1

INORGANIC ANALYSES DATA SHEET

CLIENT ID NO.: B0G867

Lab Name: L.A.S. Contract: HANFORD

Lab Code: LOCK Case No.: 729WHD SAS No.: SDG No.: L5015F

Matrix (soil/water): WATER Lab Sample ID: L5015-12

Level (low/med): LOW Date Received: 07/29/95

% Solids: 0.

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	38.7	B		P
7440-36-0	Antimony	58.0	U		P
7440-38-2	Arsenic	98.0	U		P
7440-39-3	Barium	33.9	B		P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	5.0	U		P
7440-70-2	Calcium	52600		E	P
7440-47-3	Chromium	33.2			P
7440-48-4	Cobalt	6.0	U		P
7440-50-8	Copper	3.0	U		P
7439-89-6	Iron	13.5	B		P
7439-92-1	Lead	56.0	U		P
7439-95-4	Magnesium	5950			P
7439-96-5	Manganese	2.0	U		P
7440-02-0	Nickel	15.0	U		P
7440-09-7	Potassium	2430	B		P
7782-49-2	Selenium	87.0	U		P
7440-22-4	Silver	4.0	U		P
7440-23-5	Sodium	7230			P
7440-28-0	Thallium	50.0	U		P
7440-62-2	Vanadium	4.0	U		P
7440-66-6	Zinc	6.1	B		P

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

FORM I - IN

1

INORGANIC ANALYSES DATA SHEET

CLIENT ID NO.: B0G866

Lab Name: L.A.S. Contract: HANFORD

Lab Code: LOCK Case No.: 729WHT SAS No.: SDG No.: L5015W

Matrix (soil/water): WATER Lab Sample ID: L5015-2

Level (low/med): LOW Date Received: 07/29/95

% Solids: 0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	52.2	B		P
7440-36-0	Antimony	58.0	U		P
7440-38-2	Arsenic	98.0	U		P
7440-39-3	Barium	31.0	B		P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	5.0	U		P
7440-70-2	Calcium	45100			P
7440-47-3	Chromium	46.9			P
7440-48-4	Cobalt	6.0	U		P
7440-50-8	Copper	3.0	U		P
7439-89-6	Iron	83.0	B		P
7439-92-1	Lead	56.0	U		P
7439-95-4	Magnesium	5280			P
7439-96-5	Manganese	2.0	U		P
7440-02-0	Nickel	15.0	U		P
7440-09-7	Potassium	2210	B		P
7782-49-2	Selenium	87.0	U		P
7440-22-4	Silver	4.0	U		P
7440-23-5	Sodium	6700			P
7440-28-0	Thallium	50.0	U		P
7440-62-2	Vanadium	4.0	U		P
7440-66-6	Zinc	7.2	B		P

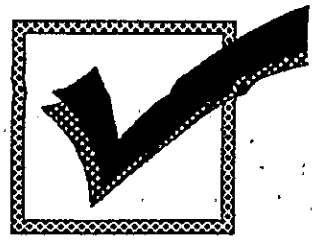
Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

Nonmetals Analytical Data Technical Review Checklist
(Analyst)



Analyst Name *(Print)*: Mike Nys	Analysis Date: 7/29/95
Client(s) Name: Bechtel Hanford	LAL Batch ID: 729-bh
Method No: 180.1 / Turbidity	Instrument: HF DRT 100B

Description	Yes	No	Comments	
Completeness Review				
1. Was required method/SOP followed?	X			
2. Are all raw data available and labeled properly (e.g., methods used, units, sample IDs, dilution factors, reruns)?	X			
3. Are all nonconformities in the raw data noted and/or explained?	X			
4. Were all the client samples analyzed for all constituents and QC as specified on the LAL Bench Sheets?	X			
Data Quality Assessment				
5. Were samples properly preserved and analyzed within the method-specified holding time?	X			
6. Are instrument calibration criteria met?	X			
7. Are initial and continuing calibration verification data (bracketing the samples of interest) within criteria?	X			
8. Are bracketing initial and continuing calibration blank data within criteria?	X			
9. Are matrix spike and/or matrix spike duplicate (if required) recovery data within criteria?	X			
10. Are method blank data within criteria?	X			
11. Are duplicate precision data within criteria?	X			
12. Are laboratory control sample data within criteria?	X			
13. Has spike verification been performed adequately?	X		*LAL ID(s):* L5015-4	*SVP Initials:* MC
14. Has the *status* been updated in the ACS?	X			

Notes and comments:

I certify, to the best of my knowledge, that the data are acceptable and in compliance with the laboratory policies and client requests, except as noted above.

Analyst's Signature/Date: 7/29/95

Secondary Reviewer's Initials/Date: 7-31-95

Lockheed Analytical Laboratory
Metals Analytical Data
Technical Review Checklist
(Analyst)

Analyst Name *(Print)*: Jeffrey Lindner	Instrument: TJA ICAP 61-E	Method: CLP / 6010

Batch Number	Client Name	Code Comments	Bench Sheet included Y/N	ACS updated Y/N
727 NYP	LAS QA Department	1st run. Complete. *	Yes	Yes
729 WHT	Westinghouse Hanford	1st run. Partial. Reanalysis req'd for Sb.	No	No
729 WHD	"	1st run. " "	No	No

CODE ANOMALY
10 Prep Blank data was not within criteria
11 Laboratory Control Sample was not within criteria
12 Duplicate Precision was not met
13 Matrix Spike recovery was not within criteria
00 Other

Description	Yes	No	Comments
Completeness Review 1. Were the standard operating procedures (SOP) followed?	✓		
2. Are all raw data available and labeled properly (e.g., methods used, units, sample IDs, dilution factors, reruns)?	✓		
3. Are all abnormalities in the raw data noted and/or explained?	✓		
4. Were all the client samples analyzed for all constituents and QC as specified on the LAL Bench Sheets?	✓		
Data Quality Assessment 5. Was the sample properly preserved and analyzed within the method-specified holding time?	✓		
6. Were the instrument calibration criteria met?	✓		
7. Are the initial and continuing calibration verification samples data bracketing the samples of interest within criteria?		✓	ICB failed for Sb.
8. Are the bracketing initial and continuing calibration blank data within criteria?	✓		
9. *For ICP Only:* Are the interference check standard recovery data within criteria?	✓		

Notes and comments: * Report Sb from Trace data.

I certify, to the best of my knowledge, that the data are acceptable and in compliance with the laboratory policies and client requests, except as noted above.

04 Aug 95
Analyst Signature/Date

C A Schlosslin 8/8/95
Secondary Reviewer Initials/Date

Lockheed

ICP RUN LOG

Date: 04 Aug 95 **Start Time:** 16:07

Analyst: Jeffrey Lindner **End Time:** 20:39

Sensitivity Check (10 ppm Mn / 10 ppm Cu): 2.47

ICP File Folder: I95215A.DBF

QC REFERENCE PAGE:	307

BATCH #	COMMENTS
727 NYP	1st run. Complete.
729 WHT	1st run. Partial. Reanalysis req'd for Sb.
729 WHD	1st run. " "
	04 Aug 95

ANALYST: [signature] **DATE:** 04 Aug 95

The sample loading lists are kept in a 3-ring binder next to the instrument and will be bound as needed.

REVIEWER: _____ **DATE:** _____

ICP RUN LOG - QC REFERENCE PAGE

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	SOURCE	LOT NUMBER	PREPARATION DATE	EXPIRATION DATE
ICV	NIST / Inorganic Ventures*	95066A	3/7/95	10/1/95
MICV	NIST	925073947	7/31/95	9/1/96
CRI	Inorganic Ventures	95118	4/26/95	9/1/96
ICSA	"	9101876417	-	4/1/96
ICSAB	"	9101875433	-	9/1/95
STD A	"	95062	3/3/95	9/1/95
STD B	"	925073943	7/6/95	9/1/95

* 2nd source

SPIKE A	Inorganic Ventures	95089	3/30/95	9/1/95
SPIKE B	Plasma Chem Assoc.	9101876027	-	2/28/96
SPIKE C	Inorganic Ventures	95089	3/30/96	11/1/95
AFCEE Spike	"	95123	5/3/95	9/1/95
TCLP Spike	"	95118	4/28/95	9/1/95

Page prepared by: _____ **Date:** 03 Aug 95

Reviewer: _____ **Date:** _____

LOCKHEED ANALYTICAL SERVICES

RAD DATA REPORT (ra01)

Bechtel Hanford, Inc. * Richland, WA

Bechtel Hanford Project (Project BECHTEL-HANFORD)

Client Sample ID: B0G866 — LAL Sample ID: L5015-5

Date Collected: 27-JUL-95 — Date Received: 29-JUL-95

Matrix: Water — Login Number: L5015

Constituent	Analyzed	Batch	Activity	Error	MDA	DataQual	Units
Ac-228(Ra-228)	07-AUG-95	GAMMA SPEC LAL-0063_25798	-20.	16.	39.		pCi/L
Co-58	07-AUG-95	GAMMA SPEC LAL-0063_25798	2.6	5.8	7.4		pCi/L
Co-60	07-AUG-95	GAMMA SPEC LAL-0063_25798	-2.0	3.0	10.		pCi/L
Cs-137	07-AUG-95	GAMMA SPEC LAL-0063_25798	2.9	5.8	7.3		pCi/L
Eu-152	07-AUG-95	GAMMA SPEC LAL-0063_25798	-4.	11.	46.		pCi/L
Eu-154	07-AUG-95	GAMMA SPEC LAL-0063_25798	0	12.	38.		pCi/L
Eu-155	07-AUG-95	GAMMA SPEC LAL-0063_25798	-7.0	6.4	18.		pCi/L
Fe-59	07-AUG-95	GAMMA SPEC LAL-0063_25798	-2.9	6.2	21.		pCi/L
Pb-212	07-AUG-95	GAMMA SPEC LAL-0063_25798	6.5	9.7	14.		pCi/L
Pb-214(Ra-226)	07-AUG-95	GAMMA SPEC LAL-0063_25798	6.	12.	18.		pCi/L
Ra-226(GAMMA)	07-AUG-95	GAMMA SPEC LAL-0063_25798	-150	110	170		pCi/L
Ru-106	07-AUG-95	GAMMA SPEC LAL-0063_25798	-6.	39.	69.		pCi/L
U-235(GAMMA)	07-AUG-95	GAMMA SPEC LAL-0063_25798	8.	27.	40.		pCi/L
Gross Alpha	22-AUG-95	GR ALP/BETA LAL-0060_25854	0.8	1.2	2.0		pCi/L
Gross Beta	22-AUG-95	GR ALP/BETA LAL-0060_25854	11.4	2.0	2.2		pCi/L
Total radio-strontium	23-AUG-95	SR-90 LAL-0196_25855	1.15	0.44	0.67		pCi/L
U-233/4	29-AUG-95	U-ISOTOPIC LAL-0108_26719	0.89	0.23	0.13		pCi/L
U-235	29-AUG-95	U-ISOTOPIC LAL-0108_26719	0.055	0.085	0.13		pCi/L
U-238	29-AUG-95	U-ISOTOPIC LAL-0108_26719	0.66	0.20	0.13		pCi/L

LOCKHEED ANALYTICAL SERVICES

RAD DATA REPORT (ra01)

Bechtel Hanford, Inc. * Richland, WA

Bechtel Hanford Project (Project BECHTEL-HANFORD)

Client Sample ID: B0G866 LAL Sample ID: L5015-11

Date Collected: 27-JUL-95 Date Received: 29-JUL-95

Matrix: Water Login Number: L5015

Constituent	Analyzed	Batch	Activity	Error	MDA	DataQual	Units
C-14	26-AUG-95	C-14 LAL-0209_26505	311.	22.	12.		pCi/L
H-3	24-AUG-95	TRITIUM(H3) LAL-0066_25853	2850	430	260		pCi/L

PROJECT Gross Alpha/Beta LCS

Notebook No. 0474

Continued From Page

SECONDARY / WORKING LEVEL STANDARD DILUTION RECORD

Dilution Source Information

Isotope:	Am-241 and Sr-90
From NIST traceable standard?:	Yes
Vendor or Certificate I.D. # of parent standard:	Am-241 IPL - 388-100-1 Sr-90 NIST SRM 4919G
Diluted source logbook I.D. #:	Am-241 91-0225-60-1 Sr-90 91-0225-30-2
Balance verification?:	Yes
Diluent used:	0.1 N HNO_3

Dilution

*Diluent:	0.1 N HNO_3 + 42mg $Sr(NO_3)_2$/mL
*Density of diluent (g/ml):	NA
a. Parent standard activity:	Am-241 9810 pCi/mL Sr-90 6000 pCi/mL on 8/1/90
b. Amount of standard transferred:	Am-241 0.5mL Sr-90 0.5mL
c. Total amount of dilution:	500 mL
d. Activity of dilution [a * b / c]:	Am-241 9.81 pCi/mL Sr-90 6.0 pCi/mL on 8/1/90 10.8 pCi/mL on 8/1/94
Dilution logbook I.D. #:	93-0474-94

Prepared by: Joe Hutchison — Preparation date: 8/16/94

Reviewed by: Nancy Wong — Review date: AW 10-4-94

*If the diluent remains unchanged from the diluent used for the dilution source, then a weight dilution of a volume unit source can be performed without a density conversion. If the diluent changes, a weighted proportion density conversion is necessary.

LAL-91-SOP-0174

Read and Understood By

711

Signed	Date	Signed	Date
	9/20/95		

S/d. Diluted to 100 mL to make 91-0225-60-1 AA00300

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

Radionuclide	Am-241	Customer:	LOCKHEED ENGINEERING & SCIENCES Co.
Half Life:	432.7 ± 0.5 years	P.O.No.:	06LAB1245
Catalog No.:	7241	Reference Date:	November 1 1991 12:00 PST.
Source No.:	388-100-1	Contained Radioactivity:	0.997 µCi.

Description of Solution

a. Mass of solution:	5.0007	grams.
b. Chemical form:	AmCl3 in 0.5N HCl	
c. Carrier content:	None added	
d. Density:	1.0077	gram/ml @ 20°C.

Radioimpurities

None detected

Radioactive Daughters

None detected

Radionuclide Concentration

0.1994 µCi/gram.

Method of Calibration

Weighed aliquots of the solution were assayed using a liquid scintillation counter.

Uncertainty of Measurement

a. Systematic uncertainty in instrument calibration:	±2.0%
b. Random uncertainty in assay:	±0.7%
c. Random uncertainty in weighing(s):	±0.0%
d. Total uncertainty at the 99% confidence level:	±2.7%

NIST Traceability

This calibration is implicitly traceable to the National Institute of Standards and Technology.

Notes

1. Nuclear data were taken from "Table of Isotopes", Seventh Edition, edited by Virginia S. Shirley.
2. IPL participates in an NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay(and later NIST certification) of Standard Reference Materials. (As in NRC Regulatory Guide 4.15)

Gary A Gilmore
QUALITY CONTROL

ISOTOPE PRODUCTS LABORATORIES
1800 No. Keystone Street.,
Burbank, California 91504
(818) 843 - 7000

712

PROJECT Preparation of Am-241 Std.

Notebook No. 0225

Continued From Page

Cert # Parent Ref.	Calib Cert. Date	Exp. Date	Ref #	Vendor	Prep In	Witness In
388-100-1	Nov 1, 1991	5/6/94	91-0225-64	IPL	JH	[illegible]

Item #	Preparation Date	Final Conc	Initial Conc	Bar Code
1	5/6/92	9,800 pCi/g	0.9974 uCi in 5 g / 0.1994 uCi/g	AA0030

The entire standard was transferred to a 100-mL volumetric V.F. and the std Am was diluted to 100mL with 0.5N HCl.

68.4902
63.5665 g wt. VF
4.9237 g std

164.01 g std + dilution
63.57 g V.F.
100.44 g diluted Std

Activity Std = 0.1994 uCi/g × 4.9237 g of std / 100.44 g dilution

Density 0.5N HCl = 1.003598 g/ml

= 0.0098 uCi/g
or = 9,800 pCi/g

=> 0.0097748 uCi/g × 1.003598 g/ml
= 0.009810 uCi/ml
= 9810 pCi/ml

[illegible] 9/4/92

Continued on Page

Read and Understood By

Joe [illegible] Signed 5/6/92 Date

[illegible] Signed 7/13/92 Date

NOTES

(1) Approximately five milliliters of solution. Ampoule specifications:

body diameter	16.5 ± 0.5 mm
wall thickness	0.60 ± 0.04 mm
barium content	less than 2.5 percent
lead oxide content	less than 0.02 percent
other heavy elements	trace quantities

(2) Solution density is 1.014 ± 0.002 g/mL at 21.5 °C.

(3) The overall uncertainty was formed by taking three times the quadratic combination of standard deviations of the mean, or approximations thereof, for the following:

a) liquid-scintillation measurements	0.01 percent
b) gravimetric measurements	0.05 percent
c) dead time	0.10 percent
d) background	0.01 percent
e) detection efficiency	0.30 percent
f) decay-scheme data	0.10 percent
g) half life	0.01 percent
h) radionuclidic impurities	0.10 percent

(4) The limit of detection for photon-emitting impurities is:

$0.01\ \gamma\ s^{-1}g^{-1}$ between 50 and 1900 keV.

(5) The limit of detection for alpha-particle-emitting impurities is:

$0.05\ \alpha\ s^{-1}g^{-1}$.

(6) NCRP Report No. 58, 2nd Edition, February 1985, p. 365.

For further information please contact Dr. Larry Lucas at (301) 975-5546.

4919-G

NOTES ON THE USE OF STANDARD REFERENCE MATERIAL 4919G, STRONTIUM-90

The activity of the strontium-90 in the ampoule is given per gram of solution. If transfers are made by volume, the density given on the certificate can be used to compute the activity per unit volume. The activity given is the strontium-90 activity only. Because the strontium-90 is in equilibrium with its yttrium-90 daughter, which is also a beta-particle emitter, the activity given should be doubled to get the corresponding total beta-particle-emission rate.

If the solution is to be used for making quantitative sources, it should be kept tightly sealed so that evaporation, and the consequent change in the radioactivity concentration, is minimized. Glass containers are best for storage.

Dilute solutions of strontium-90 are often assayed by liquid-scintillation counting. We recommend that carrier solution containing approximately 1 mg of non-radioactive strontium be added first to the liquid-scintillation cocktail. We typically use a carrier solution containing 4 mg of strontium per mL of 0.5- molar hydrochloric acid. When 0.25 mL of this solution is added to 10 mL of emulsion-type liquid-scintillation cocktail, the resulting 1 mg of strontium per vial is generally sufficient to prevent the radioactive strontium-90 from plating out on the vial walls. A set of liquid-scintillation vials that cover a range of sample-solution masses should be prepared and monitored over several days to ensure that the efficiency is constant.

The beta-particle counting efficiency will be somewhat less than unity. A correction for the loss of low-energy beta particles can be computed using the integral-discriminator-extrapolation technique (G. Goldstein, Nucleonics 23 (1965) 67) or using the liquid-scintillation efficiency-tracing technique with tritium (B.M. Coursey et al, Int. J. Radiat. Isotopes 37 (1986) 403).

The activity concentration given on the certificate is as of 1200 hours Eastern Standard Time, August 9, 1990. To convert from EST to your local time, the table given below can be used.

TO CONVERT FROM EST TO:

EDT	Add	1 hour
CDT	Same as EST	
CST	Subtract	1 hour
MDT	Subtract	1 hour
MST	Subtract	2 hours
PDT	Subtract	2 hours
PST	Subtract	3 hours
UTC	Add	5 hours

Notebook No. LAL-91-CC-0199

PROJECT SR-90 Radionuclide Standard Preparation Continued From Page

CERT # / Parent Ref #	Calibration cert date	Expiration Date	Reference #	VENDOR	PREP WITNESS INITIALS
SRM # 4919-G	1200 Aug 1, 1990	10-2-93	SRM # 4919-6-A ~~LAL-91-CC-0199-G3~~	NIST 91-225-700+	
ITEM #	PREPARATION Date	Final Concentration	INITIAL Concentration		
1	~~12:00 EST~~ 10-2-91 ~~Aug 1, 1990~~	~~600,068.599~~ 12-2-91 6000.685 Bq/g	4.514 X 10^3 Bq-1		

9/10/91

Radionuclide = SR-90

Source # 4919-G

Source description # Solution in NIST Borosilicate glass ampule

Composition # SR-90 + Y-90 plus approximately 95 ng of non radioactive SR and yttrium per gram of 1 molar HCl.

mass approximately 5.0 grams

Radioactivity conc 4.514 X 10^3 Bq^{-1}

Reference Time = 1200 EST Aug. 1, 1990

T 1/2 = 28.5 ±0.2 years

10/2/91 Preparation

1/ weighing 100.0 ml V.F + Standard of SR-90 in ampule = 65.2000

100.0 ml V.F. (empty) (g) = 60.2814

Difference or mass (g) tot. = 4.9186

2/ Calculations:

4.514 X 103 Bq/g X 4.9186 = 22,202.5604 Bq

22,202.5604 Bq X 27.027 Pci/Bq = 600,068.5999 Pci

(STD date Aug 1, 1990)

Continued on Page

Transferred 11-19-91 Paul Tebbett (Referenced from LAL 16 0199 pg 63)

Read and Understood By

717

Signed 11/19/91 Date

Signed 12/4/91 Date

S/L. Diluted to 100 ml to make 91-0225-60-1 AA003

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

Radionuclide	Am-241	Customer:	LOCKHEED ENGINEERING & SCIENCES
Half Life:	432.7 ± 0.5 years	P.O.No.:	06LAB1245
Catalog No.:	7241	Reference Date:	November 1 1991 12:00 PST.
Source No.:	388-100-1	Contained Radioactivity:	0.997 µCi.

Description of Solution

a. Mass of solution:	5.0007 grams.
b. Chemical form:	AmCl3 in 0.5N HCl
c. Carrier content:	None added
d. Density:	1.0077 gram/ml @ 20°C.

Radioimpurities

None detected

Radioactive Daughters

None detected

Radionuclide Concentration

0.1994 µCi/gram.

Method of Calibration

Weighed aliquots of the solution were assayed using a liquid scintillation counter.

Uncertainty of Measurement

a. Systematic uncertainty in instrument calibration:	±2.0%
b. Random uncertainty in assay:	±0.7%
c. Random uncertainty in weighing(s):	±0.0%
d. Total uncertainty at the 99% confidence level:	±2.7%

NIST Traceability

This calibration is implicitly traceable to the National Institute of Standards and Technology.

Notes

1. Nuclear data were taken from "Table of Isotopes", Seventh Edition, edited by Virginia S. Shirley.
2. IPL participates in an NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay(and later NIST certification) of Standard Reference Materials. (As in NRC Regulatory Guide 4.15)

Gary F. Gilmore
QUALITY CONTROL

ISOTOPE PRODUCTS LABORATORIES
1800 No. Keystone Street.,
Burbank, California 91504
(818) 843 - 7000

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PROJECT Am-241 / 1.6" dia. filter & LCS Continued From Page ____

ISOTOPE DILUTION RECORD

Agnes Wong 4-9-93

Isotope: Am-241

Secondary/Working Level Dilution

Date: 4-9-93 Preparer's Name: A. Wong

Pipet Check / Balance Wt. Check Done (✓)

Diluted Source ID (log#): 91-225-60-1

Diluent used: 0.5 N HCl

A: Source activity: 21700 dpm/g (9774.8 pCi/g)

B: Amount of source transferred: 10.3235 g

C: Total amount of dilution: 100.1029 g

D: Activity of dilution (A*B/C): 2237.90 dpm/g

E: Density of Diluent: 1.0010 g/ml

* F: Activity by volume (D*E): 2240.14 dpm/ml

Dilution Log Book ID: ~~92-335~~ RW 92-353-81-1

Reviewed by: LJ Date: 4/9/93

1.6" diameter filter LCS for Gamma Spec. 955 5/18/93
(in petri dish and sealed)

Prepared by Nee Van Nguyen 5/10/93 — Cut Whatman Glass Micro-Fiber Cotton paper (originally 3" dia.) to 1.6" dia. — Pipetted on filter

^{137}Cs LAL-0199- 0.200 ml * 975.13 pCi/ml = 195.0 pCi (≡ 197.8 pCi 4-2-91)

^{60}Co LAL-0225-80-1 0.200 ml (998.1 pCi/ml) * 40.3 Bq/ml = 199.6 pCi (≡ 259.1 pCi 4-2-91)

(same pipette amounts as p.80 ←)

Continued on Page N/A

Read and Understood By

Agnes Wong — Signed — 4-9-93 — Date

Jack S. Schuett — Signed — 721 5-18-93 — Date

U.S. Environmental Protection Agency
Environmental Monitoring Systems Laboratory-Las Vegas
Nuclear Radiation Assessment Division

Calibration Certificate

Description

Principal radionuclide: Strontium-90 — Half-life: 28.6 years

Nominal activity: 27 nano curies

Nominal volume: 5 ml in ampoule/bottle number: 94003-1

Measurement Activity of principal radionuclide

Activity per gram of this solution

5.40 nano curies of Strontium-90

at 0400 hours PST on April 1, 1994

Activity of daughter radionuclide

The principal activity was accompanied at the quoted time by

5.40 nano curies Per gram

of the daughter nuclide Yttrium-90

Total mass of this solution

Approximately 5.0 grams

Method of measurement

The activity of the primary solution was measured by liquid scintillation counting.

The activity of the dilution was measured by liquid scintillation counting.

Useful Life

This radionuclide has decayed through 0.0 half lives since it was obtained by EMSL-LV

We recommend that this solution should not be used after August 1994

This dilution was prepared for the 1994 ASTM Collaborative Study of a test method for the determination of Sr-90 in water.

722

Revised 1/84

Purity

The manufacturer states that activities other than that of the principal nuclide and of its daughter nuclides, if any, were estimated/known to be.

(1)	less than equal to	%	of the principal activity
(2)	less than equal to	%	of the principal activity
(3)	less than equal to	%	of the principal activity

The activity of impurity (1) is not (2) is not (3) is not included in the quoted figures of the principal activity.

Random Errors

The precision of this standard was such that the certified value of the radioactive concentration of the principal activity had a standard error (sm) not greater than ± 0.1 %

(The 99.7% confidence limits are given by t(sm) where t is obtained from the student t factor for the degree of freedom (n-1)).

The maximum uncertainty due to the assessable systematic errors (dilution, counting, and known uncertainty of the standard) is obtained by the separate arithmetic summation of the positive and negative systematic error ($+\delta - \delta'$). These have been estimated not to exceed

+3.8 % or - 3.8 %

the overall uncertainty (often called accuracy) is an estimate of the possible divergence of the quoted result from the true value. It is a combination of random error [t(sm)] at the 99.7% confidence limits and the worst case estimate of the systematic errors ($+\delta, -\delta'$)
The overall uncertainty is therefore calculated on the basis of $+[t(sm)+\delta]$. $-[t(sm)+\delta]$
and is +4.0 % . - 4.0 % of the quoted radioactive concentration.

Decay Schemes

This standardization is based on the following assumptions of the principle nuclide, its daughter nuclides and impurities (no allowance for error in these assumptions or the assumption of quoted half-life have been included in the statement of accuracy above).

Strontium-90 decays 100 percent by beta emission to yttrium-90. Yttrium-90 also decays 100 percent by beta emission.

Chemical Composition of Solution

Carrier content per gram of solution: 30 micrograms strontium

Other components: 0.1 M HCl

Preservative:

Remarks

723

Date Certificate Prepared April 26, 1994

Approval Signature Paul B. Hahn

PROJECT Sr-90

Notebook No. 0474

Continued From Page

INITIAL STANDARD DILUTION RECORD

Standard Information:

Isotope:	Sr-90	Vendor:	EPA
Activity of Standard Received:	2.7×10^4 uCi	Vendor I.D. #	94003-1
Weight of Standard Received (g):	5.0 g	LAL I.D. #:	AC5281
Standard Activity (pCi/g):	5.4×10^3 pCi/g	NIST Traceable ?	yes
Halflife in Years or Days:	28.6 yrs	Certificate #:	94003-1
Reference Date:	4-1-1994	Receiver's Name:	K Free
		Date Received:	5-3-94

Primary Dilution

Balance Verification?:	yes
Diluent Used:	0.1M HCl
a: Decay Corrected Standard Activity (pCi/g):	5.4×10^3 pCi/g
b: Weight of the Source Transferred (g):	4.9670 g
c: Total diluted weight (g):	49.91 g
d: Total Diluted Volume (mL)	50 mL
e: Activity of Dilution by Weight (pCi/g) [a * b / c]:	537.4 pCi/g
f: Calculated Density of Solution (g/ml) [c / d]:	0.9982 g/mL
g: Activity of Dilution by Volume (pCi/mL) [e * f]:	536.44 pCi/mL
h. Dilution Logbook I.D. #:	~~93-474-81-1~~ 93-474-82-1 CP 4/7/95

Prepared By: Agnes Wong Preparation Date: 6-15-94

Reviewed By: Joe Hutchison Review Date: 6/30/94

Purity/Cross Check Performed By: Check Date:

724

Signed	Date	Signed	Date

Los Alamos Technical Associates, Inc.

8633 Gage Blvd. / Kennewick, WA 99336 / Telephone (509) 783-4369 / FAX (509) 783-9661

October 11, 1995
LATA95-198

Ms. Joan Kessner
Bechtel
1022 Lee Boulevard
Richland, WA 99352

Subject: VB404.02, SDG LK5015-LAS

Dear Ms. Kessner:

Attached is the data validation report for analytical results for 100-KR-4 Groundwater Round 8, (SDG LK5015-LAS). The package was received by Los Alamos Technical Associates on September 21, 1995.

If you have any questions, please feel free to contact me.

Sincerely,

Brent Morris for

Marsha C. Webb
Deputy Project Manager

Attachment

cc: Jeanette Duncan, CH2M Hill
Don Smith, LATA
VB404.02
MCW/lb

ln

DATA VALIDATION REPORT
for
100-KR-4 GROUNDWATER ROUND 8
Metals Analysis
SDG LK5015-LAS
LATA VB404.02

Bechtel Hanford Inc.
P.O. Box 969
Richland, Washington

October 11, 1995

Table of Contents

100-KR-4 GROUNDWATER ROUND 8
Data Validation Narrative

INTRODUCTION

All samples in Sample Delivery Group (SDG) LK5015-LAS (VB404.02) were validated at level D as defined in the Data Validation Procedures for Chemical Analysis (WHC-SD-EN-SPP-002, Rev. 2).

The analyses were performed by Lockheed Analytical Services

ANALYSES REQUESTED

See Table 1.

DATA QUALITY OBJECTIVES

Precision:	Goals for precision were met with the exception of those items discussed in the "**Qualification Summary Table**".
Accuracy:	Goals for accuracy were met.
Sample Result Verification:	All sample results were supported in the raw data.
Detection Limits:	Detection limit goals were met for all sample results as specified in the *Remedial Investigation/Feasibility Study Work Plan for the 100-KR-4 Operable Unit, DOE/RL-90-21, Rev. 0.*
Completeness:	The data package was 100% complete for all requested analyses.

MAJOR DEFICIENCIES

No major deficiencies were identified during data validation which required qualification of data as unusable.

MINOR DEFICIENCIES

Minor deficiencies were identified during validation which required qualification of data as estimated. See the "**Qualification Summary Table**".

Table 1
Chain-of-Custody
Analysis Request

LATA ID #: VB404.02 SDG: LK5015-LAS

Sample Information					Analyses Requested	
SAMPLE NO.	DATE COLLECTED	MATRIX	SAF	FIELD QC INFO	1	2
B0G866	27-Jul-95	WATER	B95-069	Split of B0G820	X	
B0G867	27-Jul-95	WATER	B95-069	Split of B0G821		X

Method References:

	Analysis	Method
1.	ICP Metals-TAL (Unfiltered)	6010
2.	ICP Metals-TAL (Filtered)	6010

REFERENCES

WHC 1993, *Data Validation Procedures for Chemical Analyses*, WHC-SD-EN-SPP-002, Rev. 2, Westinghouse Hanford Company, Richland, Washington.

DOE 1992, *Remedial Investigation/Feasibility Study Work Plan for the 100-KR-4 Operable Unit*, DOE/RL-90-21, Rev. 0, Department of Energy-Hanford, Richland, Washington.

GLOSSARY OF VALIDATION APPLIED QUALIFIERS (CHEMISTRY)

Qualifiers which may be applied by data validators in compliance with the procedures herein are as follows.

U- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ- Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a QC deficiency identified during data validation, the associated quantitation limit is an estimate.

J- Indicates the compound or analyte was analyzed for and detected. The associated concentration is an estimate, but the data are usable for decision making purposes.

BJ- Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.

R- Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency the data are unusable.

UR- Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data are unusable due to an identified QC deficiency.

GLOSSARY OF LABORATORY APPLIED QUALIFIERS

Qualifiers which may be applied by the laboratory in compliance with applicable requirements are as follows.

Commonly used laboratory metals (inorganic) qualifiers:

U- Indicates the analyte was analyzed for but not detected in the sample.

B- Indicates the analyte concentration is less than the CRDL but greater than the IDL.

E- Indicates the value reported is estimated due to the presence of interference.

N- Indicates spiked sample recovery was not within the control limits.

Qualification Summary Table

Qualification Summary Table

Inorganics (Metals)

ANALYTE	TYPE	QUALIFIER	SAMPLES AFFECTED	DQO	REASON
Antimony	MINOR	UJ	B0G866	BLANKS	Preparation blank value is negative and outside acceptance criteria.
Iron	MINOR	U	B0G866	BLANKS	Preparation blank value is positive and outside acceptance criteria.
Thallium	MINOR	UJ	B0G867	BLANKS	Preparation blank value is negative and outside acceptance criteria.
Potassium	MINOR	U	B0G866 B0G867	BLANKS	Calibration blank value is positive and outside acceptance criteria.
Thallium	MINOR	UJ	B0G866	BLANKS	Calibration blank value is negative and outside acceptance criteria.
Calcium	MINOR	J	B0G867	PRECISION	Serial dilution percent difference is outside acceptance criteria and the sample results are greater than 50 times the instrument detection limit.

Comments:

Sample B0G866 is a field split of B0G820 and B0G867 is a field split of B0G821. The field splits are evaluated in SDG W0647-QES (VB404.04).

Data Summary Table

METALS
DATA SUMMARY TABLE

LATA ID#: VB404.02		HEIS #:	B0G866		B0G867	
		Date:	27-Jul-95		27-Jul-95	
		Matrix:	WATER		WATER	
Constituent	CAS #	Units	Results	Q	Results	Q
Aluminum	7429-90-5	µg/L	52.2	B	38.7	B
Antimony	7440-36-0	µg/L	58.0	UJ	58.0	U
Arsenic	7440-38-2	µg/L	98.0	U	98.0	U
Barium	7440-39-3	µg/L	31.0	B	33.9	B
Beryllium	7440-41-7	µg/L	1.0	U	1.0	U
Cadmium	7440-43-9	µg/L	5.0	U	5.0	U
Calcium	7440-70-2	µg/L	45100		52600	J
Chromium	7440-47-3	µg/L	46.9		33.2	
Cobalt	7440-48-4	µg/L	6.0	U	6.0	U
Copper	7440-50-8	µg/L	3.0	U	3.0	U
Iron	7439-89-6	µg/L	83.0	U	13.5	B
Lead	7439-92-1	µg/L	56.0	U	56.0	U
Magnesium	7439-95-4	µg/L	5280		5950	
Manganese	7439-96-5	µg/L	2.0	U	2.0	U
Nickel	7440-02-0	µg/L	15.0	U	15.0	U
Potassium	7440-09-7	µg/L	2210	U	2430	U
Selenium	7782-49-2	µg/L	87.0	U	87.0	U
Silver	7440-22-4	µg/L	4.0	U	4.0	U
Sodium	7440-23-5	µg/L	6700		7230	
Thallium	7440-28-0	µg/L	50.0	UJ	50.0	UJ
Vanadium	7440-62-2	µg/L	4.0	U	4.0	U
Zinc	7440-66-6	µg/L	7.2	B	6.1	B

Shaded areas indicate changes by the validator.

Sample Results (Form I's)

1

INORGANIC ANALYSES DATA SHEET

CLIENT ID NO.: B0G866

Lab Name: L.A.S. Contract: HANFORD

Lab Code: LOCK Case No.: 729WHT SAS No.: SDG No.: L5015W

Matrix (soil/water): WATER Lab Sample ID: L5015-2

Level (low/med): LOW Date Received: 07/29/95

% Solids: 0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	52.2	B		P	
7440-36-0	Antimony	58.0	~~U~~		P	UJ
7440-38-2	Arsenic	98.0	U		P	
7440-39-3	Barium	31.0	B		P	
7440-41-7	Beryllium	1.0	U		P	
7440-43-9	Cadmium	5.0	U		P	
7440-70-2	Calcium	45100			P	
7440-47-3	Chromium	46.9			P	
7440-48-4	Cobalt	6.0	U		P	
7440-50-8	Copper	3.0	U		P	
7439-89-6	Iron	83.0	~~B~~		P	U
7439-92-1	Lead	56.0	U		P	
7439-95-4	Magnesium	5280			P	
7439-96-5	Manganese	2.0	U		P	
7440-02-0	Nickel	15.0	U		P	
7440-09-7	Potassium	2210	~~B~~		P	U
7782-49-2	Selenium	87.0	U		P	
7440-22-4	Silver	4.0	U		P	
7440-23-5	Sodium	6700			P	
7440-28-0	Thallium	50.0	~~U~~		P	UJ
7440-62-2	Vanadium	4.0	U		P	
7440-66-6	Zinc	7.2	B		P	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

BM
10-4-95

SW - 846

1

INORGANIC ANALYSES DATA SHEET

CLIENT ID NO.: B0G867

Lab Name: L.A.S. Contract: HANFORD

Lab Code: LOCK Case No.: 729WHD SAS No.: SDG No.: L5015F

Matrix (soil/water): WATER Lab Sample ID: L5015-12

Level (low/med): LOW Date Received: 07/29/95

% Solids: 0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	38.7	B		P	
7440-36-0	Antimony	58.0	U		P	
7440-38-2	Arsenic	98.0	U		P	
7440-39-3	Barium	33.9	B		P	
7440-41-7	Beryllium	1.0	U		P	
7440-43-9	Cadmium	5.0	U		P	
7440-70-2	Calcium	52600		E	P	J
7440-47-3	Chromium	33.2			P	
7440-48-4	Cobalt	6.0	U		P	
7440-50-8	Copper	3.0	U		P	
7439-89-6	Iron	13.5	B		P	
7439-92-1	Lead	56.0	U		P	
7439-95-4	Magnesium	5950			P	
7439-96-5	Manganese	2.0	U		P	
7440-02-0	Nickel	15.0	U		P	
7440-09-7	Potassium	2430	~~B~~		P	U
7782-49-2	Selenium	87.0	U		P	
7440-22-4	Silver	4.0	U		P	
7440-23-5	Sodium	7230			P	
7440-28-0	Thallium	50.0	~~B~~		P	UJ
7440-62-2	Vanadium	4.0	U		P	
7440-66-6	Zinc	6.1	B		P	

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

FORM I - IN

BM 10-4-95

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Checklist

LATA INORGANIC (METALS)
DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
VALIDATION PROCEDURE:	☐ WHC-CM-5-3, Rev. 0			☒ WHC-SD-EN-SPP-002, Rev. 2	

PROJECT:	100-KR-4		**SDG:**	LK5015-LAS	
VALIDATOR:	B MORRIS BM 10-4-95	**LATA NO:**	VB404.02	**DATE:**	4-Oct-95
REVIEWER:	B SEYMOUR AS 10-10-95	**LAB:**	LAS	**CASE:**	N/A
SAF NO:	B95-069	**QAPP NO:**	DOE/RL-90-21, Rev. 0	**SAP NO:**	N/A

ANALYSES REQUESTED

☒ ICP Metals (Unfiltered) 6010		☒ ICP Metals (Filtered) 6010			
SAMPLE NO.	MATRIX	SAMPLE NO.	MATRIX		
B0G866	WATER	B0G867	WATER		

	YES	NO	N/A
1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE			
Is technical verification documentation present?	☒	☐	☐
Is a case narrative present?	☒	☐	☐
2. HOLDING TIMES			
Are sample holding times acceptable?	☒	☐	☐

See HOLDING TIME SUMMARY form

	YES	NO	N/A
3. INSTRUMENT PERFORMANCE AND CALIBRATIONS			
Were initial calibrations performed on all instruments?	☒	☐	☐
Are initial calibrations acceptable?	☒	☐	☐
Are ICP interference checks acceptable?	☒	☐	☐
Were ICV and CCV checks performed on all instruments?	☒	☐	☐
Are ICV and CCV checks acceptable?	☒	☐	☐
Validation calculation checks were performed and are acceptable.	☒	☐	☐

If NO(s) are checked, see CALIBRATION DATA SUMMARY form

4. BLANKS	YES	NO	N/A
Were ICB and CCB checks performed for all applicable analyses?	X		
Are ICB and CCB results acceptable?		X	
Were preparation blanks analyzed?	X		
Are preparation blank results acceptable?		X	

If NO(s) are checked, see BLANK AND SAMPLE DATA SUMMARY form

5. ACCURACY	YES	NO	N/A
Were spike samples analyzed at the proper frequency?	X		
Are all spike sample recoveries acceptable?	X		
Are all elements spiked at an appropriate level?	X		
Was a post digestion spike analyzed?			X
Are all post digestion spike recoveries acceptable?			X
Were laboratory control samples (LCS) analyzed at the proper frequency?	X		
Are all LCS recoveries acceptable?	X		
Validation calculation checks were performed and are acceptable.	X		

If NO(s) are checked, see ACCURACY DATA SUMMARY form

6. PRECISION	YES	NO	N/A
Were laboratory duplicates analyzed at the proper frequency?	X		
Are all duplicate RPD values acceptable?	X		
Were MS/MSDs analyzed?			X
Are all MS/MSD RPD values acceptable?			X
Were ICP serial dilution samples analyzed at the proper frequency?	X		
Are all ICP serial dilution %D values acceptable?		X	
Validation calculation checks were performed and are acceptable.	X		

If NO(s) are checked, see PRECISION DATA SUMMARY form

7. FIELD QC SAMPLES

	YES	NO	N/A
Were field QC samples (field/trip blanks, duplicates, splits, performance audit) identified?	X		
Are field/trip blank results acceptable? (see Blank Data Summary form)			X
Are field duplicate RPD values acceptable? (see Field QC evaluation)			X
Are field split RPD values acceptable? (see Field QC evaluation)			X
Are performance audit sample results acceptable?			X

Comments: The following field splits were identified: B0G820/B0G866 and B0G821/B0G867.
Split results are evaluated in SDG W0647-QES (VB404.04).

8. FURNACE AA QUALITY CONTROL

	YES	NO	N/A
Were duplicate injections required?			X
Are all duplicate injection %RSD values acceptable?			X
Were analytical spikes required?			X
Are all analytical spike recoveries acceptable?			X
Was MSA required?			X
Are all MSA results acceptable?			X
Validation calculation checks were performed and are acceptable.			X

Comments:

9. REPORTED RESULTS AND DETECTION LIMITS

	YES	NO	N/A
Are results reported for all requested analyses?	X		
Are all results supported in the raw data?	X		
Are results calculated properly?	X		
Do results meet the CRDLs?	X		
Validation calculation checks were performed and are acceptable.	X		

Comments:

VALIDATION SUMMARY

For deficiencies (major and minor) and comments, please refer to the Qualification Summary Table.

LATA INORGANIC (METALS)
DATA VALIDATION CHECKLIST

HOLDING TIME SUMMARY

SDG:	LK5015-LAS		VALIDATOR: B MORRIS					DATE:	04-Oct-95	
PROJECT:	100-KR-4		REVIEWER: B SEYMOUR					LATA NO.:	VB404.02	
HEIS-SN	MATRIX CODE	ANALYSIS	DATE COLLECTED	PREP DATE	ANALYSIS DATE	PREP HT (days)	*Required HT (days)*	ANALYSIS HT (days)	*Required HT (days)*	VAL Q
B0G866	WATER	ICP Metals	27-Jul-95	N/A	06-Aug-95	N/A	***N/A***	10	***180***	NONE
B0G867	WATER	ICP Metals	27-Jul-95	N/A	06-Aug-95	N/A	***N/A***	10	***180***	NONE

LATA INORGANIC (METALS)
DATA VALIDATION CHECKLIST

BLANK DATA SUMMARY

SDG:	LK5015-LAS		VALIDATOR:	B MORRIS					DATE:	04-Oct-95
PROJECT:	100-KR-4		REVIEWER:	B SEYMOUR					LATA NO.:	VB404.02
BLANK ID	ANALYTE	RESULT	LAB Q	RT	UNITS	2X RESULT	5X RESULT	10X RESULT	SAMPLES AFFECTED	VAL Q
Prep Blank B0G866	Antimony	-59.33	B					593.3	B0G866	UJ
Prep Blank B0G866	Iron	40.93	B				204.65		B0G866	U
Prep Blank B0G867	Thallium	-55.43	B					554.3	B0G867	UJ
Cal Blank	Potassium	636.3	B				3181.5		B0G866 B0G867	U
Cal Blank	Thallium	-94.9	B			189.8			B0G866	UJ

Lab Name: L.A.S._____ Contract: HANFORD___

Lab Code: LOCK__ Case No.: 729WHD SAS No.: _____ SDG No.: L5015F

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L_

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum	29.0	U	29.0	U	29.0	U	29.0	U	29.000	U	P
Antimony	58.0	U	58.0	U	58.0	U	58.0	U	58.000	U	P
Arsenic	98.0	U	98.0	U	98.0	U	98.0	U	98.000	U	P
Barium	21.0	U	21.0	U	21.0	U	21.0	U	21.000	U	P
Beryllium	1.0	U	1.0	U	1.0	U	1.0	U	1.000	U	P
Cadmium	5.0	U	5.0	U	5.0	U	5.0	U	5.000	U	P
Calcium	32.0	U	32.0	U	32.0	U	32.0	U	32.000	U	P
Chromium	3.0	U	3.0	U	3.0	U	3.0	B	3.000	U	P
Cobalt	6.0	U	6.0	U	6.0	U	6.0	U	6.000	U	P
Copper	3.0	U	3.0	U	3.0	U	3.0	U	3.000	U	P
Iron	12.0	U	12.0	U	12.0	U	12.0	U	12.000	U	P
Lead	56.0	U	56.0	U	75.2	B	56.0	U	56.000	U	P
Magnesium	50.0	U	50.0	U	50.0	U	50.0	U	50.000	U	P
Manganese	2.0	U	2.0	U	2.0	U	2.0	U	2.000	U	P
Nickel	15.0	U	15.0	U	15.0	U	15.0	U	15.000	U	P
Potassium	600.0	U	600.0	U	600.0	U	600.0	U	600.000	U	P
Selenium	87.0	U	87.0	U	87.0	U	87.0	U	87.000	U	P
Silver	4.0	U	4.0	U	4.0	U	4.0	U	4.000	U	P
Sodium	70.0	U	70.0	U	70.0	U	70.0	U	70.000	U	P
Thallium	50.0	U	50.0	U	50.0	U	-60.3	B	-55.430	B	P
Vanadium	4.0	U	4.0	U	4.0	U	4.0	U	4.000	U	P
Zinc	4.0	U	4.0	U	4.0	U	4.0	U	4.000	U	P

10-4-95

Lab Name: L.A.S._____ Contract: HANFORD___

Lab Code: LOCK__ Case No.: 729WHT SAS No.: _____ SDG No.: L5015W

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L_

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum	29.0	U	29.0	U	29.0	U	29.0	U	29.000	U	P
Antimony	58.0	U	58.0	U	58.0	U	58.0	U	-59.330	B	P
Arsenic	98.0	U	98.0	U	98.0	U	98.0	U	98.000	U	P
Barium	21.0	U	21.0	U	21.0	U	21.0	U	21.000	U	P
Beryllium	1.0	U	1.0	U	1.0	U	1.0	U	1.000	U	P
Cadmium	5.0	U	5.0	U	5.0	U	5.0	U	5.000	U	P
Calcium	32.0	U	32.0	U	32.0	U	32.0	U	32.000	U	P
Chromium	3.0	U	3.0	U	3.0	U	3.0	B	3.610	B	P
Cobalt	6.0	U	6.0	U	6.0	U	6.0	U	6.000	U	P
Copper	3.0	U	3.0	U	3.0	U	3.0	U	3.000	U	P
Iron	12.0	U	12.0	U	12.0	U	12.0	U	40.930	B	P
Lead	56.0	U	56.0	U	75.2	B	56.0	U	56.000	U	P
Magnesium	50.0	U	50.0	U	50.0	U	50.0	U	50.000	U	P
Manganese	2.0	U	2.0	U	2.0	U	2.0	U	2.000	U	P
Nickel	15.0	U	15.0	U	15.0	U	15.0	U	15.000	U	P
Potassium	600.0	U	600.0	U	600.0	U	600.0	U	600.000	U	P
Selenium	87.0	U	87.0	U	87.0	U	87.0	U	87.000	U	P
Silver	4.0	U	4.0	U	4.0	U	4.0	U	4.000	U	P
Sodium	70.0	U	70.0	U	70.0	U	70.0	U	70.000	U	P
Thallium	50.0	U	50.0	U	50.0	U	-60.3	B	50.000	U	P
Vanadium	4.0	U	4.0	U	4.0	U	4.0	U	4.000	U	P
Zinc	4.0	U	4.0	U	4.0	U	4.0	U	4.000	U	P

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BLANKS

Lab Name: L.A.S._____ Contract: HANFORD___

Lab Code: LOCK__ Case No.: 729WHT SAS No.: _____ SDG No.: L5015W

Preparation Blank Matrix (soil/water): _____

Preparation Blank Concentration Units (ug/L or mg/kg): _____

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum			29.0	U							P
Antimony			58.0	U	58.0	U					P
Arsenic			98.0	U							P
Barium			21.0	U							P
Beryllium			1.0	U							P
Cadmium			5.0	U							P
Calcium			32.0	U							P
Chromium			3.6	B							P
Cobalt			6.0	U							P
Copper			3.0	U							P
Iron			12.0	U							P
Lead			56.0	U							P
Magnesium			50.0	U							P
Manganese			2.0	U							P
Nickel			15.0	U							P
Potassium			636.3	B							P
Selenium			87.0	U							P
Silver			4.0	U							P
Sodium			70.0	U							P
Thallium			-94.9	B							P
Vanadium			4.0	U							P
Zinc			4.0	U							P

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LATA INORGANIC (METALS)
DATA VALIDATION CHECKLIST

PRECISION DATA SUMMARY

SDG: LK5015-LAS					VALIDATOR: B MORRIS								DATE: 04-Oct-95		
PROJECT: 100-KR-4					REVIEWER: B SEYMOUR								LATA NO.: VB404.02		
HEIS-SN	ANALYTE	RESULTS	LAB Q	IDL µg/L	10*IDL µg/L	50*IDL µg/L	SERIAL DIL %D	CRDL µg/L	2 CRDL mg/Kg	5 CRDL mg/Kg	DUPE RPD %	DUPE CRDL dif	MS/MSD RPD	SAMPLES AFFECTED	VAL Q
B0G867	Calcium	52607.26		32		1600	13.3%							B0G867	J
B0G866	All results are acceptable.														

000023

9

ICP SERIAL DILUTION

CLIENT ID NO.

B0G867 L

Lab Name: L.A.S. Contract: HANFORD

Lab Code: LOCK Case No.: 729WHD SAS No.: SDG No.: L5015F

Matrix (soil/water): WATER Level (low/med): LOW

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum	38.71	B	145.00	U	100.0		P
Antimony	58.00	U	290.00	U			P
Arsenic	98.00	U	490.00	U			P
Barium	33.94	B	105.00	U	100.0		P
Beryllium	1.00	U	5.00	U			P
Cadmium	5.00	U	25.00	U			P
Calcium	52607.26		45622.86		13.3	E	P
Chromium	33.20		43.60	B	31.3		P
Cobalt	6.00	U	30.00	U			P
Copper	3.00	U	15.00	U			P
Iron	13.54	B	60.00	U	100.0		P
Lead	56.00	U	280.00	U			P
Magnesium	5950.25		5412.55	B	9.0		P
Manganese	2.00	U	10.00	U			P
Nickel	15.00	U	75.00	U			P
Potassium	2434.05	B	4262.68	B	75.1		P
Selenium	87.00	U	435.00	U			P
Silver	4.00	U	20.57	B			P
Sodium	7229.75		6913.97	B	4.4		P
Thallium	50.00	U	250.00	U			P
Vanadium	4.00	U	20.00	U			P
Zinc	6.14	B	20.00	U	100.0		P

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LATA INORGANIC (METALS)
DATA VALIDATION CHECKLIST

PERCENT RECOVERY (ICV/CCV)

SDG: LK5015-LAS

Date: 4-Oct-95

LATA No.: VB404.02

Validator: B MORRIS

Analyte	ICV/CCV ID	Observed Value	True Value	%R
		O	A	
Aluminum	ICV	99652	100000	99.7%
Aluminum	CCV	25217	25000	100.9%
Zinc	ICV	10122	10000	101.2%
Zinc	CCV	10222	10000	102.2%

LATA INORGANIC (METALS)
DATA VALIDATION CHECKLIST

MATRIX SPIKE RECOVERY (MS)

SDG: LK5015-LAS Date: 4-Oct-95

LATA No.: VB404.02 Validator: B MORRIS

Analyte	Sample ID	Spike Sample Result	Sample Result	Spike Added	%R
		SSR	SR	SA	
Aluminum	B0G866	2073.79	52.18	2000	101.1%
Zinc	B0G867	558.49	6.14	500	110.5%

000026

LATA INORGANIC (METALS)
DATA VALIDATION CHECKLIST

PERCENT RECOVERY (LCS)

SDG: LK5015-LAS Date: 4-Oct-95

LATA No.: VB404.02 Validator: B MORRIS

Analyte	Observed value	True value	%R
	OLCS	ALCS	
Aluminum	2049.16	2000	102.5%
Zinc	525.82	500	105.2%

LATA INORGANIC (METALS)
DATA VALIDATION CHECKLIST

RELATIVE PERCENT DIFFERENCE

SDG: LK5015-LAS Date: 4-Oct-95

LATA No.: VB404.02 Validator: B MORRIS

Analyte	Sample ID	Original (Sample) concentration	Duplicate concentration	RPD
		OS	D	
Aluminum	B0G866	52.18	61.17	15.9%
Zinc	B0G867	6.14	6.65	8.0%

LATA INORGANIC (METALS)
DATA VALIDATION CHECKLIST

PERCENT DIFFERENCE (ICP SERIAL DILUTION)

SDG: LK5015-LAS Date: 4-Oct-95

LATA No.: VB404.02 Validator: B MORRIS

Analyte	Analyte Concentration before Dilution	Analyte Concentration after Serial Dilution	%D
	I	S	
Magnesium (B0G866)	5279.34	5333.04	1.0%
Calcium (B0G867)	52607.26	45622.86	13.3%

LATA INORGANIC (METALS)
DATA VALIDATION CHECKLIST

INORGANICS RESULTS CALCULATION, WATER

SDG: LK5015-LAS Date: 4-Oct-95

LATA No.: VB404.02 Validator: B MORRIS

Analyte	Concentration from curve		Dilution Factor	Concentration (µg/L)
	CONCW	units	DFW	
Calcium (B0G866)	45.09	mg/L	1	45090
Zinc (B0G866)	0.0061	mg/L	1	6.1

Laboratory Case Narrative

CASE NARRATIVE
INORGANIC METALS ANALYSES

The routine calibration and quality control analyses performed for this batch include as applicable: instrument tune (ICP/MS only), initial and continuing calibration verification, initial and continuing calibration blanks, method blank(s), laboratory control sample(s), ICP interference check samples (ICP only), serial dilutions, analytical (post-digestion) spike samples, matrix spike (predigestion) sample(s), duplicate sample(s).

Preparation and Analysis Requirements

- One water sample for total metals analysis by EPA Method 6010. The samples were prepared as LAS Batch 729BHT and analyzed for selected analytes as requested on the chain of custody. Sample B0G866 (L5015-2) was used for matrix spike and duplicate and serial dilution. All data flags due to the performance of the above-mentioned QC are also associated with every sample digested with this batch.

Holding Time Requirements

- All samples were analyzed within the method-specific holding times.

Internal Quality Control

- All internal quality control were within acceptance limits.

Sample Results

- The following qualifiers are reported on the basis of the techniques employed to perform the analyses:

  "P" ICP-AES

Nalini Prabhakar — **Prepared By**

08/11/95 — **Date**

BM 10495

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CASE NARRATIVE
INORGANIC METALS ANALYSES

The routine calibration and quality control analyses performed for this batch include as applicable: instrument tune (ICP/MS only), initial and continuing calibration verification, initial and continuing calibration blanks, method blank(s), laboratory control sample(s), ICP interference check samples (ICP only), serial dilutions, analytical (post-digestion) spike samples, matrix spike (predigestion) sample(s), duplicate sample(s).

Preparation and Analysis Requirements

- One water sample for dissolved metals analysis by EPA Method 6010. As the measured turbidity of the sample was less than 1 NTU, it was batched as 729BHD for selected dissolved analytes as requested on the chain of custody. Sample B0G867 (L5015-12) was used for matrix spike and duplicate and serial dilution. All data flags due to the performance of the above-mentioned QC are also associated with every sample digested with this batch.

Holding Time Requirements

- All samples were analyzed within the method-specific holding times.

Internal Quality Control

- All internal quality control were within acceptance limits with the following exceptions:

- In the analysis of calcium, the percent difference of serial dilution slightly exceeded the 10% control limit. This may be due to physical interferences. All calcium results for the associated samples are flagged with an "E".

Sample Results

- The following qualifiers are reported on the basis of the techniques employed to perform the analyses:

"P" ICP-AES

Nalini Prabhakar — **Prepared By**

08/11/95 — **Date**

10/4/95

Chain-of-Custody Information

Bechtel Hanford, Inc. L5015

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 1

Data Turnaround: ☐ Priority ■ Normal

Collector: K-Lee	Company Contact: R. E. Peterson	Telephone: (509) 372-9638
Project Designation: 100-KR-4 Groundwater Sampling - Round 8	Sampling Location: 100 K	SAF No.: B95-069
Ice Chest No.: ERC-FS-001	Field Logbook No.: ERC-1047	Method of Shipment: Federal Express BW 7-28-95
Shipped To: Lockheed	Offsite Property No.: BW 7-28-95 NHA W95-0-0204-42	Bill of Lading/Air Bill No.: DXA 2904635937
Possible Sample Hazards/Remarks		

Preservation	HNO_3	Cool 4°C	Cool 4°C	HNO_3	Cool 4°C	Cool 4°C		HNO_3		
Type of Container	G	G	P/G	P/G	G	P/G		G		
No. of Container(s)	1	1	1	6	1	1		1		
Volume	500mL	500mL	250mL	1L	1L	20mL		500mL		
SAMPLE ANALYSIS 7-27-95 RR	ICP Metals - TAL (Unfiltered)	Anions (IC) -F, Cl, SO_4, NO_2, NO_3, PO_4	Turbidity	Gross Alpha, Gross Beta, U-234/235/238, Sr-90, Gamma	Tritium, C-14	Activity Scan		ICP Metals - TAL (Filtered)		

Sample No.	Matrix*	Date Sampled	Time Sampled										
B0G866	W	7-27-95	1122	X	X	X	X	X	X				
B0G867	W	7-27-95	1122								X		

CHAIN OF POSSESSION

	Sign/Print Names	Date/Time
Relinquished By: JCR RR AG-R-22 (ERC)		7-27-95 1415
Received By: GRL Kim Whitten BWhitten		1415 7-27-95
Relinquished By: ERC Kim Whitten BWhitten		0800 7-28-95
Received By		
Relinquished By		
Received By		
Relinquished By		
Received By		

SPECIAL INSTRUCTIONS

Sample analysis for phosphate, nitrate, and nitrite by EPA 300.0; and turbidity by EPA 180.1 is being requested for information only. The ERC Contractor acknowledges that the 48-hour holding time will not be met.

The Activity Scan is for all sample numbers listed on this chain of custody.

Matrix*
- S = Soil
- SE = Sediment
- SO = Solid
- SL = Sludge
- W = Water
- O = Oil
- A = Air
- DS = Drum Solids
- DL = Drum Liquids
- T = Tissue
- WI = Wipes
- L = Liquid
- V = Vegetation
- X = Other

LABORATORY SECTION	Received By: Paul C Davis	Title: Sample Custodian	Date/Time: 7-29-95 9:15am	
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time	

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END OF PACKAGE

DATA VALIDATION REPORT
for
100-KR-4 GROUNDWATER ROUND 8
General Chemistry Analysis
SDG LK5015-LAS
LATA VB404.02

Bechtel Hanford Inc.
P.O. Box 969
Richland, Washington

October 11, 1995

Table of Contents

100-KR-4 GROUNDWATER ROUND 8
Data Validation Narrative

INTRODUCTION

All samples in Sample Delivery Group (SDG) LK5015-LAS (VB404.02) were validated at level D as defined in the Data Validation Procedures for Chemical Analysis (WHC-SD-EN-SPP-002, Rev. 2).

The analyses were performed by Lockheed Analytical Services.

ANALYSES REQUESTED

See Table 1.

DATA QUALITY OBJECTIVES

Precision:	Goals for precision were met.
Accuracy:	Goals for accuracy were met.
Sample Result Verification:	All sample results were supported in the raw data.
Detection Limits:	Detection limit goals were met for all sample results as specified in the *Remedial Investigation/Feasibility Study Work Plan for the 100-KR-4 Operable Unit, DOE/RL-90-21, Rev. 0.*
Completeness:	The data package was 86% complete for all requested analyses.

MAJOR DEFICIENCIES

Major deficiencies were identified during validation which required qualification of data as unusable. See the "**Qualification Summary Table**".

MINOR DEFICIENCIES

Minor deficiencies were identified during validation which required qualification of data as estimated. See the "**Qualification Summary Table**".

Table 1
Chain-of-Custody
Analysis Request

LATA ID #: VB404.02 SDG: LK5015-LAS

Sample Information					Analyses Requested	
SAMPLE NO.	DATE COLLECTED	MATRIX	SAF	FIELD QC INFO	1	2
B0G866	27-Jul-95	WATER	B95-069	Split of B0G820	X	X

Method References:

	Analysis	Method
1.	Anions (Cl,F,NO_2,NO_3,PO_4,SO_4)	300.0
2.	Turbidity	180.1

REFERENCES

WHC 1993, *Data Validation Procedures for Chemical Analyses*, WHC-SD-EN-SPP-002, Rev. 2, Westinghouse Hanford Company, Richland, Washington.

DOE 1992, *Remedial Investigation/Feasibility Study Work Plan for the 100-KR-4 Operable Unit*, DOE/RL-90-21, Rev. 0, Department of Energy-Hanford, Richland, Washington.

GLOSSARY OF VALIDATION APPLIED QUALIFIERS (CHEMISTRY)

Qualifiers which may be applied by data validators in compliance with the procedures herein are as follows.

U- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ- Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a QC deficiency identified during data validation, the associated quantitation limit is an estimate.

J- Indicates the compound or analyte was analyzed for and detected. The associated concentration is an estimate, but the data are usable for decision making purposes.

BJ- Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.

R- Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency the data are unusable.

UR- Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data are unusable due to an identified QC deficiency.

GLOSSARY OF LABORATORY APPLIED QUALIFIERS

Qualifiers which may be applied by the laboratory in compliance with applicable requirements are as follows.

Commonly used laboratory general chemistry qualifiers:

U- Indicates the analyte was analyzed for but not detected in the sample.

H- Sample analysis performed outside of method-or client-specified maximum holding time requirement.

B- For CLP analysis only - Reported value is less than the contract required detection limit (CRDL) but greater or equal to the instrument detection limit (IDL).

Qualification Summary Table

Qualification Summary Table

General Chemistry

ANALYTE	TYPE	QUALIFIER	SAMPLES AFFECTED	DQO	REASON
Ortho-Phosphate	MAJOR	UR	B0G866	HOLD TIME	Holding time is exceeded by greater than 2 times.
Nitrate	MINOR	J	B0G866	HOLD TIME	Holding time is exceeded by 2 times.
Nitrite	MINOR	UJ	B0G866	HOLD TIME	Holding time is exceeded by 2 times.

Data Summary Table

GENERAL CHEMISTRY
DATA SUMMARY TABLE

LATA ID#: VB404.02		HEIS #:	B0G866	
		Date:	27-Jul-95	
		Matrix:	W	
Constituent	CAS #	Units	Results	Q
Chloride by IC	16887-00-6	mg/L	3.9	
Fluoride by IC	16984-48-8	mg/L	0.093	B
Sulfate by IC	14808-79-8	mg/L	34	
Nitrate by IC	14797-55-8	mg/L	4.1	J
Nitrite by IC	17497-65-0	mg/L	0.002	UJ
Ortho Phosphate by IC	14265-44-2	mg/L	0.020	UR
Turbidity	TURBIDITY	NTU	0.94	

Shaded areas indicate changes by the validator.

Sample Results (Form I's)

LOCKHEED ANALYTICAL SERVICES

Sample Results

Client Sample ID: B0G866	Date Collected: 27-JUL-95
Matrix: Water	Date Received: 29-JUL-95
Percent Solids: N/A	

Constituent	Units	Method	Result	Project Reporting Limit	Data Qualifier(s)	Date Analyzed	LAS Batch ID	LAS Sample ID
Turbidity	NTU	180.1	0.94	N/A		29-JUL-95	25751	L5015-4
Chloride	mg/L	300.0	3.9	0.020		31-JUL-95	25760	L5015-3
Fluoride	mg/L	300.0	0.093	0.10	B	01-AUG-95	25761	L5015-3
Nitrate-N	mg/L	300.0	4.1	0.020	~~H~~ J	31-JUL-95	25762	L5015-3
Nitrite-N	mg/L	300.0	< 0.002	0.010	~~HU~~ UJ	31-JUL-95	25763	L5015-3
Ortho Phosphate	mg/L	300.0	< 0.020	0.10	~~HA~~ UR	01-AUG-95	25764	L5015-3
Sulfate	mg/L	300.0	34.	0.10		31-JUL-95	25765	L5015-3

bjs
9-28-95

000012

~~03C~~

Checklist

LATA GENERAL CHEMISTRY
DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E

VALIDATION PROCEDURE:	☐ WHC-CM-5-3, Rev. 0		☒ WHC-SD-EN-SPP-002, Rev. 2		
PROJECT:	100-KR-4		**SDG:**	LK5015-LAS	
VALIDATOR:	BJ SEYMOUR BJS 10-4-95	**LATA NO:**	VB404.02	**DATE:**	28-Sep-95
REVIEWER:	BJ MORRIS BJM 10-11-95	**LAB:**	LAS	**CASE:**	N/A
SAF NO:	B95-069	**QAPP NO:**	DOE/RL-90-21, Rev.0	**SAP NO:**	N/A

ANALYSES REQUESTED

☒	Anions 300.0	☒	Turbidity 180.1	

SAMPLE NO.	MATRIX	**COMMENTS:**
B0G866	WATER	

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

	YES	NO	N/A
Is technical verification documentation present?	☒	☐	☐
Is a case narrative present?	☒	☐	☐

2. HOLDING TIMES

	YES	NO	N/A
Are sample holding times acceptable?	☐	☒	☐

See HOLDING TIME SUMMARY form

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

	YES	NO	N/A
Were initial calibrations performed on all instruments?	☒	☐	☐
Are initial calibrations acceptable?	☒	☐	☐
Were calibration checks performed on all instruments?	☒	☐	☐
Are calibration checks acceptable?	☒	☐	☐
Validation calculation checks were performed and are acceptable.	☒	☐	☐

If NO(s) are checked, see CALIBRATION DATA SUMMARY form

4. BLANKS	YES	NO	N/A
Were laboratory blanks performed for all applicable analyses?	X		
Are laboratory blank results acceptable?	X		
Were preparation blanks analyzed?	X		
Are preparation blank results acceptable?	X		

If NO(s) are checked, see BLANK AND SAMPLE DATA SUMMARY form

5. ACCURACY	YES	NO	N/A
Were spike samples analyzed at the proper frequency?	X		
Are all spike sample recoveries acceptable?	X		
Were laboratory control samples (LCS) analyzed at the proper frequency?	X		
Are all LCS recoveries acceptable?	X		
Validation calculation checks were performed and are acceptable.	X		

If NO(s) are checked, see ACCURACY DATA SUMMARY form

6. PRECISION	YES	NO	N/A
Were laboratory duplicates analyzed at the proper frequency?	X		
Are all duplicate RPD values acceptable?	X		
Were MS/MSDs analyzed?			X
Are all MS/MSD RPD values acceptable?			X
Validation calculation checks were performed and are acceptable.	X		

If NO(s) are checked, see PRECISION DATA SUMMARY form

7. FIELD QC SAMPLES	YES	NO	N/A
Were field QC samples (field/trip blanks, duplicates, splits, performance audit) identified?	X		
Are field/trip blank results acceptable? (see Blank Data Summary form)			X
Are field duplicate RPD values acceptable? (see Field QC calculations)			X
Are field split RPD values acceptable? (see Field QC calculations)			X
Are performance audit sample results acceptable?			X

Comments: Sample B0G866 is identified as a split of B0G820. The split will be evaluated in SDG# W0647-QES, (LATA ID # VB404.04).

8. ANALYTE QUANTITATION	YES	NO	N/A
Was analyte quantitation performed properly?	X		
Are results calculated properly?	X		
Validation calculation checks were performed and are acceptable.	X		

Comments:

9. REPORTED RESULTS AND DETECTION LIMITS	YES	NO	N/A
Are results reported for all requested analyses?	X		
Are all results supported in the raw data?	X		
Do results meet the CRDLs?	X		
Validation calculation checks were performed and are acceptable.	X		

Comments:

VALIDATION SUMMARY

For deficiencies (major and minor) and comments, please refer to the Qualification Summary Table.

LATA GENERAL CHEMISTRY
DATA VALIDATION CHECKLIST

HOLDING TIME SUMMARY

SDG: LK5015-LAS			VALIDATOR: BJ SEYMOUR					DATE: 28-Sep-95		
PROJECT: 100-KR-4			REVIEWER: BJ MORRIS					LATA NO.: VB404.02		
HEIS-SN	MATRIX CODE	ANALYSIS	DATE COLLECTED	PREP DATE	ANALYSIS DATE	PREP HT (days)	***Required HT (days)***	ANALYSIS HT (days)	***Required HT (days)***	VAL Q
B0G866	WATER	Anions(Cl,SO_4)	27-Jul-95	N/A	31-Jul-95	N/A	***N/A***	4	***28***	NONE
B0G866	WATER	Anions Fluoride	27-Jul-95	N/A	01-Aug-95	N/A	***N/A***	5	***28***	NONE
B0G866	WATER	Anions(NO_2,NO_3)	27-Jul-95	N/A	31-Jul-95	N/A	***N/A***	4	***2***	J/UJ
B0G866	WATER	Anions(PO_4)	27-Jul-95	N/A	01-Aug-95	N/A	***N/A***	5	***2***	UR
B0G866	WATER	Turbidity	27-Jul-95	N/A	29-Jul-95	N/A	***N/A***	2	***2***	NONE

LATA GENERAL CHEMISTRY
CALCULATION SPREADSHEET

LINEAR REGRESSION ANALYSIS

SDG: LK5015-LAS

Date: 28-Sep-95

LATA No.: VB404.02

Validator: BJ SEYMOUR

Analyte/Calibration Date: Chloride/7-31-95

Concentration x	Absorbance y
0.000	0
20.000	39700
50.000	142275
100.000	196518
1000.000	1972288
5000.000	11348591

r	r^2
0.9996	0.9993

slope	x intercept
2270.4440	23.4434

1/slope	y intercept
0.0004	-51544.574

LINEAR REGRESSION ANALYSIS

SDG: LK5015-LAS

Date: 28-Sep-95

LATA No.: VB404.02

Validator: BJ SEYMOUR

Analyte/Calibration Date: Turbidity/7-29-95

Concentration x	Absorbance y
0.00	0.00
5.00	4.18
10.00	8.40
20.00	16.70
40.00	33.400

r	r^2
1.0000	1.0000

slope	x intercept
0.8347	-0.0185

1/slope	y intercept
1.1980	0.0155

LATA GENERAL CHEMISTRY
CALCULATION SPREADSHEET

PERCENT RECOVERY (ICV/CCV)

SDG: LK5015-LAS Date: 28-Sep-95

LATA No.: VB404.02 Validator: BJ SEYMOUR

Analyte	Sample ID	Observed Value	True Value	%R
		O	A	
Chloride	ICV	942.450	1000	94%
Chloride	CCV	955.046	1000	96%
Turbidity	ICV	7.80	8	98%
Turbidity	CCV	20.47	20	102%

LATA GENERAL CHEMISTRY
CALCULATION SPREADSHEET

MATRIX SPIKE RECOVERY (MS)

SDG: LK5015-LAS Date: 28-Sep-95

LATA No.: VB404.02 Validator: BJ SEYMOUR

Analyte	Sample ID	Spike Sample Result	Sample Result	Spike Added	%R
		SSR	SR	SA	
Chloride	B0G866	44.374	3.863	40.00	101%
Turbidity	B0G866	6.02	0.94	5.00	101.6%

LATA GENERAL CHEMISTRY
CALCULATION SPREADSHEET

PERCENT RECOVERY (LCS)

SDG: LK5015-LAS Date: 28-Sep-95

LATA No.: VB404.02 Validator: BJ SEYMOUR

Analyte	Observed value	True value	%R
	OLCS	ALCS	
Chloride	949.983	1000	95%

LATA GENERAL CHEMISTRY
CALCULATION SPREADSHEET

RELATIVE PERCENT DIFFERENCE

SDG: LK5015-LAS Date: 28-Sep-95

LATA No.: VB404.02 Validator: BJ SEYMOUR

Analyte	Sample ID	Original (Sample) concentration	Duplicate concentration	RPD
		OS	D	
Chloride	B0G866	3.863	3.891	1%
Turbidity	B0G866	0.94	1.00	6.2%

LATA GENERAL CHEMISTRY
CALCULATION SPREADSHEET

RESULTS CALCULATION, WATER

SDG: LK5015-LAS Date: 28-Sep-95

LATA No.: VB404.02 Validator: BJ SEYMOUR

Analyte	Concentration from curve		Dilution Factor	Concentration
	CONCW	units	DFW	
Chloride B0G866	3.863	mg/L	1	3.9
Turbidity B0G866	0.94	NTU	1	0.94

Laboratory Case Narrative

Lockheed Environmental Systems & Technologies Co.
Lockheed Analytical Services
975 Kelly Johnson Drive Las Vegas, Nevada 89119-3705
Telephone 702-361-0220 800-582-7605 Facsimile 702-361-8146

LOCKHEED MARTIN

August 31, 1995

Ms. Joan Kessner
Bechtel Hanford, Inc.
345 Hills
P.O. Box 969
Richland, WA 99352

RE:	Log-in No.:	L5015
	Quotation No.:	Q400000-B
	SAF:	B95-069
	Document File No.:	0729596
	BHI Document File No.:	254
	SDG No.:	LK5015

The attached data report contains the analytical results of samples that were submitted to Lockheed Analytical Services on July 29, 1995. The temperature of the cooler upon receipt was 2°C. Sample containers received agree with the chain-of-custody documentation. Sample containers were received intact. Samples were not received in time to meet the analytical holding time requirements. Method 180.1 Turbidity and Method 300.0 Nitrate, Nitrite and Ortho Phosphate were received out of holding time.

The case narratives included in the following attachments provide a detailed description of all events that occurred during sample preparation, analysis, and data review specific to the samples and analytical methods requested.

A list of data qualifiers, chain-of-custody forms, sample receiving checklist, and log-in report are also enclosed representing the samples received within this group.

If you have any questions concerning the analysis or the data please call Kathleen Hall at (509) 943-4423.

bjs 9-28-95

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Lockheed Analytical Services

Log-in No.: L5015
Quotation No.: Q400000-B
SAF: B95-069
Document File No.: 0729596
WHC Document File No.: 254
SDG No.: LK5015

Release of this data report has been authorized by the Laboratory Director or the Director's designee as evidenced by the following signature.

" I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manger or a designee, as verified by the following signature."

Sincerely,

Karen Hermann for

Kathleen M. Hall
Client Services Representative

cc: Client Services
Document Control

000026 bjs 9-28-95
005

CASE NARRATIVE
INORGANIC NON METALS ANALYSES

The routine calibration and quality control analyses performed for this batch include as applicable: instrument tune (ICP/MS only), initial and continuing calibration verification, initial and continuing calibration blanks, method blank(s), laboratory control sample(s), ICP interference check samples (ICP only), serial dilutions, analytical (post-digestion) spike samples, matrix spike (predigestion) sample(s), duplicate sample(s).

Preparation and Analysis Requirements

- One water sample was received for LK5015 and analyzed in batch 729 bh for selected analytes as requested on the chain of custody. Quality control analysis was performed on the following sample:

Client ID	LAL #		Method
BOG866	L5015-4	DUP, MS	180.1 Turbidity
BOG866	L5015-3	DUP, MS	300.0 Chloride, Fluoride, Nitrate-Nitrogen, Nitrite-Nitrogen, Orthophosphate and Sulfate

Holding Time Requirements

- All samples were analyzed within the method-specific holding times with the exception of Method 300.0 Nitrate-Nitrogen, Nitrite-Nitrogen and Orthophosphate which were received outside of holding time. All associated samples are flagged with an "H".

Method Blanks

- The concentration levels of all the requested analytes in the method blank were below the reporting detection limits.

Internal Quality Control

- All Internal Quality Control were within acceptance limits.

Kay McCann
Prepared By

August 2, 1995
Date

bjs 9-28-95

Chain-of-Custody Information

Bechtel Hanford, Inc. L5015

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 1

Data Turnaround: ☐ Priority ■ Normal

Collector: K-Lee	Company Contact: R. E. Peterson	Telephone: (509) 372-9638
Project Designation: 100-KR-4 Groundwater Sampling - Round 8	Sampling Location: 100 K	SAF No.: B95-069
Ice Chest No.: ERC-FS-001	Field Logbook No.: ERC-1049	Method of Shipment: Federal Express BW 7-28-95
Shipped To: Lockheed	Offsite Property No.: BW 7-28-95 N/A W95-0-0201-92	Bill of Lading/Air Bill No.: NXD 2904635937
Possible Sample Hazards/Remarks		

Preservation	HNO_3	Cool 4°C	Cool 4°C	HNO_3	Cool 4°C	Cool 4°C		HNO_3		
Type of Container	G	G	P/G	P/G	G	P/G		G		
No. of Container(s)	1	1	1	6	1	1		1		
Volume	500mL	500mL	250mL	1L	1L	20mL		500mL		
SAMPLE ANALYSIS	ICP Metals - TAL (Unfiltered)	Anions (IC) F, Cl, SO_4, NO_2, NO_3, PO_4	Turbidity	Gross Alpha, Gross Beta, U-234/235/238, Sr-90, Gamma	Tritium, C-14	Activity Scan		ICP Metals - TAL (Filtered)		

7-27-95 1122

Sample No.	Matrix*	Date Sampled	Time Sampled										
B0G866	W	7-27-95	~~1030~~ 1122	X	Y	Y	Y	Y	Y				
B0G867	W	7-27-95	~~1030~~ 1122								Y		

CHAIN OF POSSESSION

Relinquished By	Date/Time	Received By	Date/Time
AGR 7-27-95 (ERC)	7-27-95 1415	Kim White BWHTN	7-27-95 1415
Kim White BWHTN	7-28-95 0800	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

Sample analysis for phosphate, nitrate, and nitrite by EPA 300.0; and turbidity by EPA 180.1 is being requested for information only. The ERC Contractor acknowledges that the 48-hour holding time will not be met.

The Activity Scan is for all sample numbers listed on this chain of custody.

Matrix*: S = Soil; SE = Sediment; SO = Solid; SL = Sludge; W = Water; O = Oil; A = Air; DS = Drum Solids; DL = Drum Liquids; T = Tissue; WI = Wipe; L = Liquid; V = Vegetation; X = Other

LABORATORY SECTION	Received By: Paul Davis 0002000	Title: Sample Custodian	Date/Time: 7-29-95/9:15am
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

9-28-95 0743

END OF PACKAGE

DATA VALIDATION REPORT
for
100-KR-4 GROUNDWATER ROUND 8
Radiochemistry Analysis
SDG LK5015-LAS
LATA VB404.02

Bechtel Hanford Inc.
P.O. Box 969
Richland, Washington

October 11, 1995

Table of Contents

100-KR-4 GROUNDWATER ROUND 8
Data Validation Narrative

INTRODUCTION

All samples in Sample Delivery Group (SDG) LK5015-LAS (VB404.02) were validated at level D as defined in the Data Validation Procedures for Radiochemical Analysis (WHC-SD-EN-SPP-001, Rev. 1).

The analyses were performed by Lockheed Analytical Services.

ANALYSES REQUESTED

See Table 1.

DATA QUALITY OBJECTIVES

Precision:	Goals for precision were met.
Accuracy:	Goals for accuracy were met with the exception of those items discussed in the **"Qualification Summary Table"**.
Sample Result Verification:	All sample results were supported in the raw data.
Detection Limits:	Detection limit goals were met for all sample results as specified in the *Remedial Investigation/Feasibility Study Work Plan for the 100-KR-4 Operable Unit, DOE/RL-90-21, Rev. 0.*
Completeness:	The data package was 100% complete for all requested analyses.

MAJOR DEFICIENCIES

No major deficiencies were identified during data validation which required qualification of data as unusable.

MINOR DEFICIENCIES

Minor deficiencies were identified during validation which required qualification of data as estimated. See the **"Qualification Summary Table"**.

Table 1
Chain-of-Custody
Analysis Request

LATA ID #: VB404.02 SDG: LK5015-LAS

Sample Information					Analyses Requested								
SAMPLE NO.	DATE COLLECTED	MATRIX	SAF	FIELD QC INFO	1	2	3	4	5	6	7	8	9
B0G866	27-Jul-95	WATER	B95-069	Split of B0G820	X	X	X	X	X	X	X	X	X

Method References:

	Analysis	Method
1.	Gamma Scan	LAL-91-S0P-0063
2.	Gross Alpha	LAL-91-S0P-0060
3.	Gross Beta	LAL-91-S0P-0060
4.	Strontium-90	LAL-91-S0P-0196
5.	Uranium-233/234,-235,-238	LAL-91-S0P-0108
6.	Carbon-14	LAL-91-S0P-0209
7.	Tritium	LAL-91-S0P-0066
8.	Rad Screen	Lab Specific
9.	Activity Scan	Lab Specific

NOTES: (complete documentation of these notes can be found in the Supplemental Information Section of this report)
NOTE 1: The rad screen was deemed unnecessary prior to off-site shipment.

REFERENCES

WHC 1993, *Data Validation Procedures for Radiochemical Analyses*, WHC-SD-EN-SPP-001, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

DOE 1992, *Remedial Investigation/Feasibility Study Work Plan for the 100-KR-4 Operable Unit*, DOE/RL-90-21, Rev. 0, Department of Energy-Hanford, Richland, Washington.

GLOSSARY OF VALIDATION APPLIED QUALIFIERS (RADIOCHEMISTRY)

Qualifiers which may be applied by data validators in compliance with the procedures herein are as follows.

U- Indicates the constituent was analyzed for, but was not detected at a concentration above the Minimum Detectable Activity (MDA). The concentration reported is the sample result corrected for sample aliquot size, dilution factors, and percent solids (in the case of solid matrices) by the laboratory. The associated data should be considered usable for decision making purposes.

UJ- Indicates the constituent was analyzed for and was not detected at a concentration above the Minimum Detectable Activity (MDA). Due to a quality control deficiency identified during data validation, the result reported may not accurately reflect the sample concentration. The associated data should be considered usable for decision making purposes.

J- Indicates a constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during validation. The data should be considered usable for decision making purposes.

R- Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision making purposes.

UR- Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision making purposes.

GLOSSARY OF LABORATORY APPLIED QUALIFIERS

Qualifiers which may be applied by the laboratory in compliance with applicable requirements are as follows.
Commonly used laboratory radiochemistry qualifiers:

U- Indicates the analyte was analyzed for but not detected in the sample.

J- Indicates the value reported is estimated due to the presence of interference.

Qualification Summary Table

Qualification Summary Table

Radiochemistry

ANALYTE	TYPE	QUALIFIER	SAMPLES AFFECTED	DQO	REASON
Carbon-14	MINOR	J	B0G866	ACCURACY	Matrix spike recovery is outside acceptance criteria.

Comments:

1. Sample B0G866 is a field split of B0G820. The field splits are evaluated in SDG W0647-QES (VB404.04).
2. The "U" qualifers added to the Data Summary Tables and Form Is are laboratory concentration qualifiers to indicate that the results are <MDA and have not been applied as a result of validation.

Data Summary Table

RADIOCHEMISTRY
DATA SUMMARY TABLE

LATA ID#: VB404.02		HEIS #:	B0G866	
		Date:	27-Jul-95	
		Matrix:	WATER	
Constituent	CAS #	Units	Results	Q
Gross Alpha	ALPHA	pCi/L	0.8	U
Gross Beta	BETA	pCi/L	11.4	
Strontium-90	10098-97-2	pCi/L	1.15	
Uranium-233/234	U-233/234	pCi/L	0.89	
Uranium-235	15117-96-1	pCi/L	0.055	U
Uranium-238	U-238	pCi/L	0.66	
Carbon-14	14762-75-5	pCi/L	311	J
Tritium	10028-17-8	pCi/L	2850	
GAMMA-SCAN				
Ac-228(Ra-228)	15262-20-1	pCi/L	-20	U
Cesium-137	10045-97-3	pCi/L	2.9	U
Cobalt-58	13981-38-9	pCi/L	2.6	U
Cobalt-60	10198-40-0	pCi/L	-2.0	U
Europium-152	14683-23-9	pCi/L	-4	U
Europium-154	15585-10-1	pCi/L	0	U
Europium-155	14391-16-3	pCi/L	-7.0	U
Iron-59	14596-12-4	pCi/L	-2.9	U
Lead-212	Pb-212	pCi/L	6.5	U
Pb-214(Ra-226)	Pb-214	pCi/L	6	U
Radium-226	13982-63-3	pCi/L	-150	U
Ruthenium-106	13967-48-1	pCi/L	-6	U
U-235	15117-96-1	pCi/L	0.055	U

Shaded areas indicate changes by the validator.

Sample Results (Form I's)

LOCKHEED ANALYTICAL SERVICES

RAD DATA REPORT (ra01)

Bechtel Hanford, Inc. * Richland, WA

Bechtel Hanford Project (Project BECHTEL-HANFORD)

Client Sample ID: B0G866 — LAL Sample ID: L5015-5

Date Collected: 27-JUL-95 — Date Received: 29-JUL-95

Matrix: Water — Login Number: L5015

Constituent	Analyzed	Batch	Activity	Error	MDA	DataQual	Units
Ac-228(Ra-228)	07-AUG-95	GAMMA SPEC LAL-0063_25798	-20.	16.	39.		pCi/L U
Co-58	07-AUG-95	GAMMA SPEC LAL-0063_25798	2.6	5.8	7.4		pCi/L U
Co-60	07-AUG-95	GAMMA SPEC LAL-0063_25798	-2.0	3.0	10.		pCi/L U
Cs-137	07-AUG-95	GAMMA SPEC LAL-0063_25798	2.9	5.8	7.3		pCi/L U
Eu-152	07-AUG-95	GAMMA SPEC LAL-0063_25798	-4.	11.	46.		pCi/L U
Eu-154	07-AUG-95	GAMMA SPEC LAL-0063_25798	0	12.	38.		pCi/L U
Eu-155	07-AUG-95	GAMMA SPEC LAL-0063_25798	-7.0	6.4	18.		pCi/L U
Fe-59	07-AUG-95	GAMMA SPEC LAL-0063_25798	-2.9	6.2	21.		pCi/L U
Pb-212	07-AUG-95	GAMMA SPEC LAL-0063_25798	6.5	9.7	14.		pCi/L U
Pb-214(Ra-226)	07-AUG-95	GAMMA SPEC LAL-0063_25798	6.	12.	18.		pCi/L U
Ra-226(GAMMA)	07-AUG-95	GAMMA SPEC LAL-0063_25798	-150	110	170		pCi/L U
Ru-106	07-AUG-95	GAMMA SPEC LAL-0063_25798	-6.	39.	69.		pCi/L U
U-235(GAMMA)	07-AUG-95	GAMMA SPEC LAL-0063_25798	8.	27.	40.		pCi/L U
Gross Alpha	22-AUG-95	GR ALP/BETA LAL-0060_25854	0.8	1.2	2.0		pCi/L UJ
Gross Beta	22-AUG-95	GR ALP/BETA LAL-0060_25854	11.4	2.0	2.2		pCi/L
Total radio-strontium	23-AUG-95	SR-90 LAL-0196_25855	1.15	0.44	0.67		pCi/L
U-233/4	29-AUG-95	U-ISOTOPIC LAL-0108_26719	0.89	0.23	0.13		pCi/L
U-235	29-AUG-95	U-ISOTOPIC LAL-0108_26719	0.055	0.085	0.13		pCi/L U
U-238	29-AUG-95	U-ISOTOPIC LAL-0108_26719	0.66	0.20	0.13		pCi/L

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LOCKHEED ANALYTICAL SERVICES

RAD DATA REPORT (ra01)

Bechtel Hanford, Inc. * Richland, WA

Bechtel Hanford Project (Project BECHTEL-HANFORD)

Client Sample ID: B0G866 — LAL Sample ID: L5015-11

Date Collected: 27-JUL-95 — Date Received: 29-JUL-95

Matrix: Water — Login Number: L5015

Constituent	Analyzed	Batch	Activity	Error	MDA	DataQual	Units
C-14	26-AUG-95	C-14 LAL-0209_26505	311.	22.	12.		pCi/L J
H-3	24-AUG-95	TRITIUM(H3) LAL-0066_25853	2850	430	260		pCi/L

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Checklist

LATA RADIOCHEMISTRY
DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E

VALIDATION PROCEDURE: ☐ WHC-CM-5-3, Rev. 0 ☒ WHC-SD-EN-SPP-001, Rev. 1

PROJECT:	100-KR-4		**SDG:**	LK5015-LAS	
VALIDATOR:	A FREIER 10/10-95	**LATA NO:**	VB404.02	**DATE:**	10-Oct-95
REVIEWER:	BJ MORRIS 10-10-95	**LAB:**	LAS	**CASE:**	N/A
SAF NO:	B95-069	**QAPP NO:**	DOE/RL-90-21, Rev.0	**SAP NO:**	N/A

ANALYSES REQUESTED

☒ U-233/234/235/238 LAL-91-S0P-0108	☒ Gamma Spec LAL-91-S0P-0063	☒ Gross Alpha/Beta LAL-91-S0P-0060	☒ Carbon-14 LAL-91-S0P-0209	☒ Strontium-90 LAL-91-S0P-0196	☒ Tritium LAL-91-S0P-0060

SAMPLE NO.	MATRIX
B0G866	WATER

COMMENTS:

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

	YES	NO	N/A
Is technical verification documentation present?	☒	☐	☐
Is a case narrative present?	☒	☐	☐

2. HOLDING TIMES

	YES	NO	N/A
Are sample holding times acceptable?	☒	☐	☐
Are samples preserved correctly?	☒	☐	☐

See HOLDING TIME SUMMARY form

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

	YES	NO	N/A
Were instruments/detectors calibrated within one year of sample analysis?	☐	☒	☐
Are initial calibrations acceptable?	☒	☐	☐
Are standards NIST traceable?	☒	☐	☐
Are standards acceptable?	☒	☐	☐

Comments: Calibration of instruments/detectors was not performed within one year of sample analysis, however continuing calibration data is acceptable. Therefore, no qualifiers are assigned.

4. CONTINUING CALIBRATION	YES	NO	N/A
Background checked at proper frequency?	X		
Background check acceptable?	X		
Efficiency checked at proper frequency?	X		
Efficiency check acceptable?	X		
Calibration check standards NIST traceable?	X		
Calibration check standards acceptable?	X		

If NO(s) are checked, see CALIBRATION DATA SUMMARY form

5. BLANKS	YES	NO	N/A
Were method blanks analyzed?	X		
Are the method blanks free of analytes?	X		
Were method blank results acceptable?	X		
Validation calculation/transcription checks were performed and are acceptable.	X		

If NO(s) are checked, see BLANK DATA SUMMARY form

6. ACCURACY	YES	NO	N/A
Were spike samples analyzed at the proper frequency?	X		
Are all spike sample recoveries acceptable?		X	
Were laboratory control standards (LCS) analyzed at the proper frequency?	X		
Are all LCS recoveries acceptable?	X		
Was a tracer/chemical carrier added?	X		
Was the tracer/chemical carrier recovery acceptable?	X		
Are standard sources traceable?	X		
Are standards acceptable?	X		
Validation calculation checks were performed and are acceptable.	X		

If NO(s) are checked, see ACCURACY DATA SUMMARY form

7. PRECISION	YES	NO	N/A
Were laboratory duplicates analyzed at the proper frequency?	X		
Are all duplicate RPD values acceptable?	X		
Validation calculation checks were performed and are acceptable.	X		

If NO(s) are checked, see PRECISION DATA SUMMARY form

8. FIELD QC SAMPLES	YES	NO	N/A
Were field QC samples (field/trip blanks, duplicates, splits, performance audit) identified?	X		
Are field/trip blank results acceptable? (see Blank Data Summary form)			X
Are field duplicate RPD values acceptable? (see Field QC calculations)			X
Are field split RPD values acceptable? (see Field QC calculations)			X
Are performance audit sample results acceptable?			X

Comments: B0G866 is a field split odf B0G820. The field split RPD values will be evaluated in SDG# W0647-QES, LATA ID VB404.04.

9. REPORTED RESULTS AND DETECTION LIMITS	YES	NO	N/A
Are results reported for all requested analyses?	X		
Are all results supported in the raw data?	X		
Are results calculated properly?	X		
Do MDAs meet the RDLs?	X		
Validation calculation checks were performed and are acceptable.	X		

Comments:

VALIDATION SUMMARY

For deficiencies (major and minor) and comments, please refer to the Qualification Summary Table.

LATA RADIOCHEMISTRY
DATA VALIDATION CHECKLIST

HOLDING TIME SUMMARY

SDG: LK5015-LAS			VALIDATOR: A FREIER					DATE: 10-Oct-95		
PROJECT: 100-KR-4			REVIEWER: BJ MORRIS					LATA NO.: VB404.02		
HEIS-SN	MATRIX CODE	ANALYSIS	DATE COLLECTED	PREP DATE	ANALYSIS DATE	PREP HT (days)	***Required HT (days)***	ANALYSIS HT (days)	***Required HT (days)***	VAL Q
B0G866	WATER	U-233/34/35/38	27-Jul-95	N/A	29-Aug-95	N/A	***N/A***	33	***180***	NONE
B0G866	WATER	Gamma Scan	27-Jul-95	N/A	07-Aug-95	N/A	***N/A***	11	***180***	NONE
B0G866	WATER	Gross Alpha\Beta	27-Jul-95	N/A	22-Aug-95	N/A	***N/A***	26	***180***	NONE
B0G866	WATER	Carbon-14	27-Jul-95	N/A	26-Aug-95	N/A	***N/A***	30	***180***	NONE
B0G866	WATER	Tritium	27-Jul-95	N/A	24-Aug-95	N/A	***N/A***	28	***180***	NONE
B0G866	WATER	Strontium-90	27-Jul-95	N/A	23-Aug-95	N/A	***N/A***	27	***180***	NONE

LATA RADIOCHEMISTRY
DATA VALIDATION CHECKLIST

ACCURACY DATA SUMMARY

SDG: LK5015-LAS			VALIDATOR: A FREIER				DATE: 10-Oct-95	
PROJECT: 100-KR-4			REVIEWER: BJ MORRIS				LATA NO.: VB404.02	
				PERCENT RECOVERY (%R)				
HEIS-SN	ANALYTE	RESULTS	Lab Q	Matrix Spike	Tracer/ Carrier Yield	Laboratory Control Standard	SAMPLES AFFECTED	VAL Q
B0G866	Gross Alpha	0.795		156.0%			NONE	NONE
B0G866	Carbon-14	311		57.0%			B0G866	J

Comment:
Qualification is not required for Gross Alpha when the matrix spike is >140% and results are nondetect.

LATA RADIOCHEMISTRY
CALCULATION SPREADSHEET

MATRIX SPIKE RECOVERY (MS)

SDG: LK5015-LAS

Date: 10-Oct-95

LATA No.: VB404.02

Validator: A FREIER

Analyte	Sample ID	Spike Sample Result	Sample Result	Spike Added	%R
Tritium	B0G866	4980	2850	1810	118%
Gross Alpha	B0G866	51.1	0.795	32.2	156%

LATA RADIOCHEMISTRY
CALCULATION SPREADSHEET

PERCENT RECOVERY (LCS)

SDG: LK5015-LAS Date: 10-Oct-95

LATA No.: VB404.02 Validator: A FREIER

Analyte	Observed value	True value	%R
Co-60	211	218	97%
Tritium	2370	2260	105%
Gross Alpha	31.2	39.2	80%
Strontium	40.5	51.8	78%
U-238	27.4	28.6	96%
Carbon-14	448.0	522	86%

LATA RADIOCHEMISTRY
CALCULATION SPREADSHEET

RELATIVE PERCENT DIFFERENCE

SDG: LK5015-LAS Date: 10-Oct-95

LATA No.: VB404.02 Validator: A FREIER

Analyte	Sample ID	Original (Sample) concentration	Duplicate concentration	RPD
Tritium	B0G866	2850	2880	1.05%
Gross Alpha	B0G866	0.795	1.29	47.5%
Strontium	B0G866	1.15	1.49	25.8%
Carbon-14	B0G866	311	329	5.63%
U-235	B0G866	0.0547	0.0533	2.59%

LATA RADIOCHEMISTRY
CALCULATION SPREADSHEET

ALPHA SPEC TRACER RECOVERY

SDG: LK5015-LAS

Date: 10-Oct-95

LATA No.: VB404.02

Validator: A FREIER

Analyte	Sample ID	Gross counts/ minute	Background counts/ minute of tracer	Detector efficiency	Activity (pCi) of tracer added to sample	%R
U-232	B0G866	2.536	0.0347	0.258	10.93	0.887

LATA RADIOCHEMISTRY
CALCULATION SPREADSHEET

MINIMUM DETECTABLE ACTIVITY (MDA)

SDG: LK5015-LAS

Date: 10-Oct-95

LATA No.: VB404.02

Validator: A FREIER

Analyte	Sample ID	Bkgrnd counts/ min (cpm) or Std Dev of bkgrnd (cpm)	Count time for assoc. sample	Detector Efficiency	Ingrowth corr. factor	Tracer/ Carrier recovery factor	Decay factor	Chemical yield factor	Sample volume (L or g)	MDA
U-234	B0G866	0.0056	720	0.26	1.00	0.89	1.00	1.00	0.20	0.13
Gross Alpha	B0G866	0.028	100	0.096	1.00	1.00	1.00	1.00	0.25	1.97
Strontium	B0G866	1.01	150	0.44	1.28	0.96	1.00	1.00	0.50	0.66
Carbon-14	B0G866	2.36	60	0.71	1.00	1.00	1.00	1.00	0.05	12.21
Tritium	B0G866	0.90	20.00	0.19	1.00	1.00	1.00	1.00	0.01	263.21

LATA RADIOCHEMISTRY
CALCULATION SPREADSHEET

RESULTS CALCULATION GROSS ALPHA, TRITIUM AND CARBON-14

SDG: LK5015-LAS

Date: 10-Oct-95

LATA No.: VB404.02

Validator: A FREIER

Analyte	Gross Counts per minute	Background Counts per minute	Activity of alpha fraction in beta channel	Detector Efficiency	Sample volume (L or g)	Result
Gross Alpha	0.07	0.03	1.00	0.10	0.25	0.79
Tritium	13.01	0.90	1.00	0.19	0.01	2841.12
Carbon-14	26.71	2.36	1.00	0.71	0.05	310.72

LATA RADIOCHEMISTRY
CALCULATION SPREADSHEET

RESULTS CALCULATION TOTAL STRONTIUM

SDG: LK5015-LAS

Date: 10-Oct-95

LATA No.: VB404.02

Validator: A FREIER

Analyte	Gross Counts per minute	Background Counts per minute	Ingrowth correction Factor	Detector Efficiency	Carrier recovery factor	Strontium decay factor	Sample volume (L or g)	Result
Strontium B0G866	1.71	1.01	1.28	0.44	1.00	1.00	0.50	1.11

LATA RADIOCHEMISTRY
CALCULATION SPREADSHEET

RESULTS CALCULATION ALPHA SPEC ISOTOPES

SDG: LK5015-LAS Date: 10-Oct-95

LATA No.: VB404.02 Validator: A FREIER

Analyte	Gross Counts per minute	Background Counts per minute	Detector Efficiency	Tracer recovery factor	Sample volume (L or g)	Result
U-234	0.0958	0.0056	0.258	0.887	0.20	0.888

Laboratory Case Narrative

CASE NARRATIVE
RADIOCHEMICAL ANALYSES

The routine calibration and quality control (QC) analyses performed for this batch include as applicable: instrument calibration, initial and continuing calibration verification, quench monitoring standards, instrument background analysis, method blanks, yield tracer, laboratory control samples, matrix spike samples, duplicate samples.

NOTE: Chemical recoveries and minimum detectable activities (MDAs)can be found on the preparation sheets and calculation sheets on the attached raw data for each method.

Holding Time Requirements

All holding times were met.

Analytical Method Isotopic Uranium

The isotopic uranium analysis was performed using standard operating procedure (SOP), LAL-91-SOP-0108. The samples were analyzed in workgroup 26719. No problems were encountered during analysis and all QC criteria were met. No re-analyses were performed.

Analytical Method Gamma Spectrometry

The gamma spectrometry analysis was performed using SOP, LAL-91-SOP-0063. The samples were analyzed in workgroup 23498. No problems were encountered during the analysis and all QC criteria were met. No re-analyses were performed.

Analytical Method Gross Alpha/Beta

The gross alpha/beta analysis was performed using SOP, LAL-91-SOP-0060. The samples were analyzed in workgroup 25854. No problems were encountered during analysis and all QC criteria were met with the following exception: The alpha matrix spike (MS) recovery was out of QC criteria. Because duplicate (25854DUP1) and sample BOG866 (L5015-5) activities were below the MDA data quality is not believed to be affected. No re-analyses were performed.

AF 10-10-95

Analytical Method Strontium-90

The strontium-90 analysis was performed using SOP, LAL-91-SOP-0196. The samples were analyzed in workgroup 25855. No problems were encountered during the analysis and all QC criteria were met. No re-analyses were performed.

Analytical Method Carbon-14

The carbon-14 analysis was performed using SOP, LAL-93-SOP-0209. The samples were analyzed in workgroup 26505. No problems were encountered during the analysis and all QC criteria were met with the following exception: The MS recovery was out of QC criteria. Because all other QC criteria were met data quality is not believed to be affected. No re-analyses were performed.

Analytical Method Tritium

The tritium analysis was performed using SOP, LAL-91-SOP-0066. The samples were analyzed in workgroup 25853. No problems were encountered during analysis and all QC criteria were met. No re-analyses were performed.

Andrea Tippett
Prepared By

August 31, 1995
Date

AF
10-10-95

Chain-of-Custody Information

Bechtel Hanford, Inc. L5015 CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 1

Data Turnaround: ☐ Priority ■ Normal

Collector: K-Lee	Company Contact: R. E. Peterson	Telephone: (509) 372-9638
Project Designation: 100-KR-4 Groundwater Sampling - Round 8	Sampling Location: 100 K	SAF No.: B95-069
Ice Chest No.: ERC-FS-001	Field Logbook No.: EFL-1049	Method of Shipment: Federal Express
Shipped To: Lockheed	Offsite Property No.: ~~N/A~~ BW 7-28-95 W95-0-0204-42	Bill of Lading/Air Bill No.: ~~N/A~~ BW 7-28-95 2904635937

Possible Sample Hazards/Remarks

Special Handling and/or Storage: Maintain samples between 2°C and 6°C.

			Preservation	HNO_3	Cool 4°C	Cool 4°C	HNO_3	Cool 4°C	Cool 4°C		HNO_3		
			Type of Container	G	G	P/G	P/G	G	P/G		G		
			No. of Container(s)	1	1	1	6	1	1		1		
			Volume	500mL	500mL	250mL	1L	1L	20mL		500mL		
SAMPLE ANALYSIS				ICP Metals - TAL (Unfiltered)	Anions (IC) ~~F, Cl, SO₄~~, NO_2, NO_3, PO_4	Turbidity	Gross Alpha, Gross Beta, U-234/235/238, Sr-90, Gamma	Tritium, C-14	Activity Scan		ICP Metals - TAL (Filtered)		
Sample No.	Matrix*	Date Sampled	Time Sampled (7-27-95)										
B0G866	W	7-27-95	~~1020~~ 1122	X	X	X	X	X	X				
B0G867	W	7-27-95	~~1020~~ 1122								X		

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: AGR 220 (ERC)	Date/Time: 7-27-95 1415	Received By: ERC BWhitten	Date/Time: 7-27-95 1415
Relinquished By: ERC BWhitten	Date/Time: 7-28-95 0800	Received By:	Date/Time:
Relinquished By:	Date/Time:	Received By:	Date/Time:
Relinquished By:	Date/Time:	Received By:	Date/Time:

SPECIAL INSTRUCTIONS

Sample analysis for phosphate, nitrate, and nitrite by EPA 300.0; and turbidity by EPA 180.1 is being requested for information only. The ERC Contractor acknowledges that the 48-hour holding time will not be met.

The Activity Scan is for all sample numbers listed on this chain of custody.

Matrix*: S = Soil, SE = Sediment, SO = Solid, SL = Sludge, W = Water, O = Oil, A = Air, DS = Drum Solids, DL = Drum Liquids, T = Tissue, WI = Wipe, L = Liquid, V = Vegetation, X = Other

LABORATORY SECTION	Received By: Paule Dawes	Title: Sample Custodian	Date/Time: 7-29-95 / 9:15am
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

9513385.0032

AF 10-10-95

Supplemental Information

Environmental Restoration Contractor **ERC Team**

Interoffice Memorandum

Job No. 22192
Written Response Required: NO
CCN: N/A
OU: 100-KR-3
TSD: N/A
ERA: N/A
Subject Code: 5850

TO: W. S. Thompson N3-06 DATE: July 5, 1995

COPIES: R. L. Biggerstaff H4-91 FROM: S. K. De Mers
Radiological Controls
N3-06/376-2764

SUBJECT: **1995 Round 8 sampling for 100-KR-4**

There is no need to perform total activities prior to offsite shipment to NRC licensed labs of samples taken from the attached list of wells.

All wells listed in the attachment were reviewed for radiological content. No well listed has a β activity in excess of 100,000 pCi/l (<.1 uCi/sample based on a 1 liter sample size) nor any α activity in excess of 10,000 pCi/l (<.01 uCi/l based on a 1 liter sample). All wells show activities < 2,000 pCi/gm (< 2 nCi/gm D.O.T. limit). The highest activity in recent samples is 1.56 E6 pCi/l $\beta(H^3)$ and 150 pCi/l α.

Radiological monitoring during sampling will only be required if the wells are located in radiological areas or if the wells themselves are labeled with radiological stickers. Monitoring requirements for down hole work such as pump removal will be determined based on the history of each well on a case by case basis.

skd

AJ 10-10-95

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Lockheed Analytical Services
Sample Receiving Checklist

Client Name: Westing House - Hanford Job No. L5015 Cooler ID: n/a

COOLER CONDITION UPON RECEIPT

Temperature of cooler upon receipt:	2°C
temperature of temp. blank upon receipt:	

	Yes	No	* Comments/Discrepancies
custody seals intact	x		
chain of custody present	x		
blue ice (or equiv.) present/frozen	x		
rad survey completed	x		

SAMPLE CONDITION UPON RECEIPT

	Yes	No	* Comments/Discrepancies
all bottles labeled	x		
samples intact	x		
proper container used for sample type	x		
sample volume sufficient for analysis	x		
proper pres. indicated on the COC	x		
VOA's contain headspace		n/a	
are samples bi-phasic (if so, indicate sample ID'S):		n/a	

MISCELLANEOUS ITEMS

	Yes	No	* Comments/Discrepancies
samples with short holding times	x	~~x~~	Nitrate/nitrites, passed holding times
samples to subcontract		n/a	

ADDITIONAL COMMENTS/DISCREPANCIES

Completed by / date: Paula Adams 7-25-95

Sent to the client (date/initials): ** Client's signature upon receipt:

*Notes: * = contact the appropriate CSR of any discrepancies immediately upon receipt*

*** = please review this information and return via facsimille to the appropriate CSR (702) 361-8146*

0035

10-4-95

version 2.0 (11/11/94)

END OF PACKAGE